



BILLING CODE 3510-22-P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648-XG291

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to Pile Driving Activities for the Restoration of Pier 62, Seattle Waterfront, Elliott Bay.

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice; proposed incidental harassment authorization; request for comments.

SUMMARY: NMFS has received a request from the Seattle Department of Transportation (Seattle DOT) for authorization to take marine mammals incidental to pile driving activities for the restoration of Pier 62, Seattle Waterfront, Elliott Bay in Seattle, Washington (Season 2). Pursuant to the Marine Mammal Protection Act (MMPA), NMFS is requesting comments on its proposal to issue an incidental harassment authorization (IHA) to incidentally take marine mammals during the specified activities. NMFS will consider public comments prior to making any final decision on the issuance of the requested MMPA authorization and agency responses will be summarized in the final notice of our decision.

DATES: Comments and information must be received no later than [INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: Comments should be addressed to Jolie Harrison, Chief, Permits and Conservation Division, Office of Protected Resources, National Marine Fisheries Service.

Physical comments should be sent to 1315 East-West Highway, Silver Spring, MD 20910 and electronic comments should be sent to *ITP.egger@noaa.gov*.

Instructions: NMFS is not responsible for comments sent by any other method, to any other address or individual, or received after the end of the comment period. Comments received electronically, including all attachments, must not exceed a 25-megabyte file size. Attachments to electronic comments will be accepted in Microsoft Word or Excel or Adobe PDF file formats only. All comments received are a part of the public record and will generally be posted online <https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-construction-activities> without change. All personal identifying information (*e.g.*, name, address) voluntarily submitted by the commenter may be publicly accessible. Do not submit confidential business information or otherwise sensitive or protected information.

FOR FURTHER INFORMATION CONTACT: Stephanie Egger, Office of Protected Resources, NMFS, (301) 427-8401. Electronic copies of the applications and supporting documents, as well as a list of the references cited in this document, may be obtained online at <https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-construction-activities>. In case of problems accessing these documents, please call the contact listed above.

SUPPLEMENTARY INFORMATION:

Background

Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 *et seq.*) direct the Secretary of Commerce (as delegated to NMFS) to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are

made and either regulations are issued or, if the taking is limited to harassment, a notice of a proposed authorization is provided to the public for review.

An authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s), will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses (where relevant), and if the permissible methods of taking and requirements pertaining to the mitigation, monitoring and reporting of such takings are set forth.

NMFS has defined “negligible impact” in 50 CFR 216.103 as an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.

The MMPA states that the term “take” means to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal.

Except with respect to certain activities not pertinent here, the MMPA defines “harassment” as: any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment).

National Environmental Policy Act

To comply with the National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. §§ 4321 *et seq.*) and NOAA Administrative Order (NAO) 216-6A, NMFS must review our proposed action (*i.e.*, the issuance of an incidental harassment authorization) with respect to potential impacts on the human environment.

This action is consistent with categories of activities identified in Categorical Exclusion B4 (incidental harassment authorizations with no anticipated serious injury or mortality) of the Companion Manual for NOAA Administrative Order 216-6A, which do not individually or cumulatively have the potential for significant impacts on the quality of the human environment and for which we have not identified any extraordinary circumstances that would preclude this categorical exclusion. Accordingly, NMFS has preliminarily determined that the issuance of the proposed IHA qualifies to be categorically excluded from further NEPA review.

Summary of Request

On January 27, 2018, NMFS received a request from the Seattle DOT for a second IHA to take marine mammals incidental to pile driving activities for the restoration of Pier 62, Seattle Waterfront, Elliott Bay in Seattle, Washington. A revised request was submitted on May 18, 2018 which was deemed adequate and complete. Seattle DOT's request is for take of 12 species of marine mammals, by Level B harassment and Level A harassment (three species only). Neither Seattle DOT nor NMFS expects serious injury or mortality to result from this activity and, therefore, an IHA is appropriate.

NMFS previously issued an IHA to Seattle DOT for related work for Season 1 of this activity (82 FR 47176; October 11, 2017). Seattle DOT complied with all the requirements (*e.g.*, mitigation, monitoring, and reporting) of the previous IHA and information regarding their monitoring results may be found in the Description of Marine Mammals in the Area of Specified Activities and Estimated Take sections.

This proposed IHA would cover the second season of work for the Pier 62 Project for which Seattle DOT obtained a prior IHA (82 FR 47176; October 11, 2017) and intends to request take authorization for subsequent facets of the project. The second season of the larger project is

expected to primarily involve the remaining pile driving for Pier 62 and Pier 63. If the Seattle DOT encounters delays due to poor weather conditions, difficult pile driving, or other unanticipated challenges, an additional in-water work season may be necessary. If so, a separate IHA would be prepared for the third season of work.

Description of Specified Activities

Overview

The proposed project will replace Pier 62 and make limited modifications to Pier 63 on the Seattle waterfront of Elliott Bay, Seattle, Washington. The existing piers are constructed of creosote-treated timber piles and treated timber decking, which are failing. The proposed project would demolish and remove the existing timber piles and decking of Pier 62, and replace them with concrete deck planks, concrete pile caps, and steel piling. The majority of the timber pile removal required by the project occurred during the 2017-2018 in-water work season (Season 1).

The footprint of Pier 62 will remain as it currently is, with a small amount of additional over-water coverage (approximately 3,200 square feet) created by a new float system added to the south side of Pier 62. This float system is intended for moorage of transient, small-boat traffic, and will not be designed to accommodate mooring or berthing for larger vessels. This includes removing 815 timber piles, and will require installation of 180 steel piles for Pier 62. To offset the additional over-water coverage associated with the new float system, approximately 3,700 square feet of Pier 63 will be removed. This includes removing 65 timber piles, and will require installation of nine steel piles to provide structural support for the remaining portion of Pier 63.

Dates and Duration

In-water construction for this application is proposed from August 1, 2018 to February 28, 2019. Pile removal and installation will occur during daylight hours, typically during a work shift of eight hours or less. Timber pile removal for the remaining piles of the Pier 62 Project is estimated to occur on 10 days during the 2018–2019 in-water work window. Pile installation will occur via vibratory and impact hammers. Vibratory hammer use is estimated to occur on up to 53 days, and impact hammer use may occur on up to 64 days, for a total of up to 117 days of pile installation. Therefore, the total number of working days for the project is 127. It is expected that many of the pile installation days will involve both a vibratory and an impact hammer, resulting in fewer cumulative days of pile installation. It is anticipated that the contractor will complete the pile installation during the 2018–2019 in-water work window. In-water work may occur within a modified or shortened work window (September through February) to reduce or minimize effect on juvenile salmonids.

Specific Geographic Region

Pier 62 and Pier 63 are located on the downtown Seattle waterfront on Elliot Bay in King County, Washington just north of the Seattle Aquarium (see Figure 1 from the Seattle DOT application). The project will occur between Pike Street and Lenora Street, an urban embayment in central Puget Sound. This is an important industrial region and home to the Port of Seattle, which ranked 8th in the top 10 metropolitan port complexes in the U.S. in 2015. This area includes the proposed construction zone, Elliott Bay, and a portion of Puget Sound.

Detailed Description of the Specific Activity

During Season 1, Pier 62 was fully removed, including all support piles, structural components, and decking. The 3,700-square-foot portion of Pier 63 was also removed. A total of 831 piles were removed from Pier 62 and Pier 63 (see Table 1 below). Timber pile removal work

in Season 2 (2018-2019 in-water work window) may occur for an estimated 10 days (49 remaining timber piles, if the contractor encounters deteriorated piles that pose a safety hazard or are within the area where grated decking or habitat improvements are to be installed. Seattle DOT estimates 10 days will be needed to remove the old timber piles, 53 days for vibratory installation of steel piles, and 64 days for impact installation of steel piles for a total of 127 in-water construction days for both Pier 62 and Pier 63 (see Table 1 below). Seattle DOT expects most days for vibratory and impact installation of steel piles will overlap, for a total of fewer than 127 days.

TABLE 3. PILE INSTALLATION AND REMOVAL PLAN

Activity	Pile Type	Number of Piles	Completed During Season 1	Actual Duration Season 1	Remaining Work Season 2	Anticipated Duration Season 2	Hours per Day	Hammer Type	Single Source Sound Levels	Additive Source Sound Levels
Remove	Creosote-treated timber, 14-inch ¹	880	831 piles removed	19 days	49 timber piles	10 days	8	Vibratory	161 dB _{RMS} ²	–
	Steel template pile, 24-inch	2	–	–	2	Daily ³	–	Vibratory	177 dB _{RMS} ⁴	–
Install	Steel pile, 30-inch	189	2 steel sheet piles installed	1 day	189 steel piles	53 days	8	Vibratory	177 dB _{RMS} ⁶	180 dB _{RMS} ⁷
			–	–		64 days ⁸	8	Impact	189 dB _{RMS} ⁹	189 dB _{RMS} ¹⁰
	Steel template pile, 24-inch	2	–	–	2	Daily ³	–	Vibratory	177 dB _{RMS} ⁴	–

Notes:

1. Assumed to be 14-inch diameter.
2. Hydroacoustic monitoring during Pier 62 Season 1 showed unweighted RMS ranging from 140 dB to 169 dB, the 75th percentile of these values is 161 dB_{RMS} and was used to calculate thresholds.
3. The two template piles will be installed and removed daily. The time associated with this activity is included in the overall 8-hour pile driving day associated with installation of the 30-inch steel piles.
4. Assumed to be no greater than vibratory installation of the 30-inch steel pile.
6. Source sound from Port Townsend Test Pile Project (WSDOT 2010).
7. For simultaneous operation of two vibratory hammers installing steel pipe piles, the 180 dB_{RMS} value is based on identical single-source levels, adding three dB based on WSDOT rules for decibel addition (2018).
8. Approximately 20 percent of the pile driving effort is anticipated to require an impact hammer, which results in approximately 11 cumulative days of impact hammer activity. However, the impact hammer activity is sporadic, often occurring for short periods each day. A total of 64 days represents the number of days in which pile installation with an impact hammer could occur, with the anticipation that each day's impact hammer activity would be short.
9. Source level from Colman Dock Test Pile Project (WSDOT 2016).

10. For simultaneous operation of one impact hammer and one vibratory hammer installing 30-inch piles, the original dB_{RMS} estimates differ by more than 10 dB, so the higher value, 189 dB_{RMS} , is used based on WSDOT rules for decibel addition (2018).

RMS – root mean square: the square root of the energy divided by the impulse duration. This level is the mean square pressure level of the pulse. It has been used by NMFS to describe disturbance-related effects (i.e., harassment) to marine mammals from underwater impulse-type noises.

WSDOT – Washington State Department of Transportation

Approximately 20 percent of the pile driving effort is anticipated to require an impact hammer. However, the impact hammer activity is sporadic, often occurring for short periods each day. A total of 64 days represents the number of days in which pile installation with an impact hammer could occur, with the anticipation that each day's impact hammer activity would be short.

The 14-inch (in) timber piles will be removed with a vibratory hammer or pulled with a clamshell bucket. The 30-in steel piles will be installed with a vibratory hammer to the extent possible. The maximum extent of pile removal and installation activities are described in Table 1.

An impact hammer will be used for proofing steel piles or when encountering obstructions or difficult ground conditions. In addition, a pile template will be installed to ensure the piles are placed properly. The template, which consists of two temporary 24-inch pipe piles connected by a structural steel frame, is both installed and removed with a vibratory hammer; the contractor positions the template, installs a set of piles, then moves the template to a new area. Template piles typically do not need to be installed as deep as the structural piles; the necessary embedment will vary depending on the substrate conditions. The Seattle DOT anticipates moving the template daily, but this will not increase the total number of vibratory pile driving days. The contractor may elect to operate multiple pile crews for the Pier 62 Project. As a result, more than one vibratory or impact hammer may be active at the same time. The Seattle DOT will not operate more than two vibratory hammers concurrently. For the Pier 62 Project, there is

a low likelihood that multiple impact hammers would operate in a manner that piles would be struck simultaneously; however, as a conservative approach we used multiple-source decibel rule when determining the Level A and B harassment zones for this project. Table 2 provides guidance on adding decibels to account for multiple sources (WSDOT 2015a):

Table 2. Multiple Source Decibel Addition.

When two decibel values differ by:	Add the following to the higher decibel value:
0 - 1 dB	3 dB
2 - 3 dB	2 dB
4 - 9 dB	1 dB
>10 dB or more	0 dB

The Seattle DOT anticipates proofing 10 piles, spread over the different geological zones and construction zones of the pier foundation. For this proofing effort, one impact crane would be mobilized. In addition to proofing, if a pile reaches refusal (*i.e.*, can be driven no farther) with a vibratory hammer, an impact hammer would be used to drive the pile to the required depth or embedment. It is not possible to anticipate which piles will need to be driven with an impact hammer.

It is not possible to know in advance the location of the crews and hammers on a given day, nor how many crews will be working each day. The multiple-source decibel addition method does not result in significant increases in the noise source when an impact hammer and vibratory hammer are working at the same time, because the difference in noise sources is greater than 10 dB. For periods when two vibratory hammers are operating simultaneously, an increase in noise level could be generated, and this will be accounted for when determining Level A Harassment Zones (PTS isopleths) and Level B Harassment Zones for all marine mammal hearing groups.

If the Seattle DOT encounters delays due to poor weather conditions, difficult pile driving, or other unanticipated challenges, an additional in-water work season may be necessary. If so, a separate IHA would be prepared for the third season of work. In-water work will occur within the designated work window (August through February).

Description of Marine Mammals in the Area of Specified Activities

The marine mammal species under NMFS’s jurisdiction that have the potential to occur in the construction area include Pacific harbor seal (*Phoca vitulina*), northern elephant seal (*Mirounga angustirostris*), California sea lion (*Zalophus californianus*), Steller sea lion (*Eumetopias jubatus*), harbor porpoise (*Phocoena phocoena*), Dall’s porpoise (*Phocoenoides dalli*), long-beaked common dolphin (*Delphinus delphis*), common bottlenose dolphin (*Tursiops truncatus*), both southern resident and transient killer whales (*Orcinus orca*), humpback whale (*Megaptera novaengliae*), gray whale (*Eschrichtius robustus*), and minke whale (*Balaenoptera acutorostrata*) (Table 3). Of these, the southern resident killer whale (SRKW) and humpback whale are protected under the Endangered Species Act (ESA). Pertinent information for each of these species is presented in this document to provide the necessary background to understand their demographics and distribution in the area.

Table 3. Marine Mammal Species Potentially Present in Region of Activity

Common name	Scientific name	Stock	ESA/MM PA status; Strategic (Y/N) ¹	Stock abundance (CV, N _{min} , most recent abundance survey) ²	PBR	Annual M/SI ³
Order Cetartiodactyla – Cetacea – Superfamily Mysticeti (baleen whales)						
Family Eschrichtiidae						
Gray whale	<i>Eschrichtius robustus</i>	Eastern North Pacific	-; N	20,990 (0.05; 20,125; 2011)	624	132
Family Balaenidae						

Humpback whale	<i>Megaptera novaeangliae novaeangliae</i>	California/Oregon/Washington	E; D	1,918 (0.03; 1,876; 2017)	11.0	≥ 9.2
Minke whale	<i>Balaenoptera acutorostrata scammoni</i>	California/Oregon/Washington	-; N	636 (0.72, 369, 2014)	3.5	≥ 1.3
Superfamily Odontoceti (toothed whales, dolphins, and porpoises)						
Family Delphinidae						
Killer whale	<i>Orcinus orca</i>	Eastern North Pacific Offshore	-; N	240 (0.49, 162, 2014)	1.6	0
Killer whale	<i>Orcinus orca</i>	Eastern North Pacific Southern Resident	E; D	83 (na, 83, 2016)	0.14	0
Long-beaked common dolphin	<i>Dephinus delphis</i>	California	-; N	101,305 (0.49; 68,432, 2014)	657	≥35.4
Bottlenose dolphin	<i>Tursiops truncatus</i>	California/Oregon/Washington Offshore	-; N	1,924 (0.54; 1,255, 2014)	11	≥1.6
Family Phocoenidae (porpoises)						
Harbor Porpoise	<i>Phocoena phocoena</i>	Washington Inland Waters	-; N	11,233 (0.37; 8,308; 2015)	66	≥7.2
Dall's Porpoise	<i>Phocoenoides dalli</i>	California/Oregon/Washington	-; N	25,750 (0.45, 17,954, 2014)	172	0.3
Order Carnivora – Superfamily Pinnipedia						
Family Otariidae (eared seals and sea lions)						
California sea lion	<i>Zalophus californianus</i>	U.S.	-; N	296,750 (na, 153,337, 2011)	9,200	389
Steller sea lion	<i>Eumetopias jubatus</i>	Eastern DPS	-; N	41,638(-; 41,638; 2015)	2,498	108
Family Phocidae (earless seals)						
Harbor seal	<i>Phoca vitulina</i>	Washington Northern Inland Waters stock	-; N	11,036 (0.15, -, 1999)	Undet.	9.8
Northern elephant seal	<i>Mirounga angustirostris</i>	California breeding	-; N	179,000 (na; 81,368, 2010)	4,882	8.8

1 - Endangered Species Act (ESA) status: Endangered (E), Threatened (T)/MMPA status: Depleted (D). A dash (-) indicates that the species is not listed under the ESA or designated as depleted under the MMPA. Under the MMPA, a strategic stock is one for which the level of direct human-caused mortality exceeds PBR or which is determined to be declining and likely to be listed under the ESA within the foreseeable future. Any species or stock listed under the ESA is automatically designated under the MMPA as depleted and as a strategic stock.

2- NMFS marine mammal stock assessment reports online at: www.nmfs.noaa.gov/pr/sars/. CV is coefficient of variation; Nmin is the minimum estimate of stock abundance. In some cases, CV is not applicable.

3 - These values, found in NMFS's SARs, represent annual levels of human-caused mortality plus serious injury from all sources combined (e.g., commercial fisheries, ship strike). Annual mortality/serious injury (M/SI) often cannot be determined precisely and is in some cases presented as a minimum value or range. A CV associated with estimated mortality due to commercial fisheries is presented in some cases

Sections 3 and 4 of the application summarize available information regarding status and trends, distribution and habitat preferences, and behavior and life history, of the potentially affected species. Additional information regarding population trends and threats may be found in NMFS's Stock Assessment Reports (SAR; <https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments>) and more general information about these species (e.g., physical and behavioral descriptions) may be found on NMFS's website for whales (<https://www.fisheries.noaa.gov/whales>), dolphins and porpoises (<https://www.fisheries.noaa.gov/dolphins-porpoises>), and pinnipeds (<https://www.fisheries.noaa.gov/seals-sea-lions>).

Table 3 lists all species with expected potential for occurrence in Elliott Bay and summarizes information related to the population or stock, including regulatory status under the MMPA and ESA and potential biological removal (PBR), where known. For taxonomy, we follow Committee on Taxonomy (2017). PBR is defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population (as described in NMFS's SARs). While no mortality is anticipated or authorized here, PBR and annual serious injury and mortality from anthropogenic sources are included here as gross indicators of the status of the species and other threats.

Marine mammal abundance estimates presented in this document represent the total number of individuals that make up a given stock or the total number estimated within a particular study or survey area. NMFS's stock abundance estimates for most species represent the total estimate of individuals within the geographic area, if known, that comprises that stock.

For some species, this geographic area may extend beyond U.S. waters. All managed stocks in this region are assessed in the NMFS's U.S. 2017 Draft SARs for the Pacific (Carretta *et al.*, 2017), Alaska (Muto *et al.*, 2017) or the 2016 SARs (Carretta *et al.*, 2016) if species numbers haven't changed. All values presented in Table 3 are the most recent available at the time of publication and are available in the 2017 Draft SARs (Carretta *et al.*, 2017; Muto *et al.*, 2017) or 2016 SARs (Carretta *et al.* 2016). Additional information may be found in the 2015 Pacific Navy Marine Species Density Database (U.S. Department of the Navy (U.S. Navy) 2015) and can also be accessed online at:

http://nwtteis.com/Portals/NWTT/files/supporting_technical/REVISED_NWTT_FINAL_NMSDD_Technical_Report_04_MAY_2015.pdf.

All species that could potentially occur in the proposed survey areas are included in Table 3. As described below, all 12 species temporally and spatially co-occur with the activity to the degree that take is reasonably likely to occur, and we have proposed authorizing it.

Summary of Season 1 Pier 62 Marine Mammal Occurrence

Marine mammal monitoring during pile driving/removal activities occurred for 21 days, between December 29, 2017, and February 21, 2018. Throughout the Season 1 monitoring season, a total of 167 California sea lions and 72 harbor seals were observed, mostly at the Alki and Magnolia sites, but only a few were taken by Level B harassment. Eight California sea lions and ten harbor seals were taken by Level B harassment. There were no takes by Level A harassment nor any serious injuries or mortalities. No other species were observed.

Harbor Seal

Individual harbor seals occur along the Elliott Bay shoreline. There is one documented harbor seal haulout area near Bainbridge Island, approximately 6 miles (9.66 km) from Pier 62.

The haulout, which is estimated at less than 100 animals, consists of intertidal rocks and reef areas around Blakely Rocks and is within the area of potential effects but at the outer extent near Bainbridge Island (Jefferies *et al.* 2000), though harbor seals also make use of docks, buoys and beaches in the area. The level of use of this haulout during the fall and winter is unknown, but is expected to be much less than during the spring and summer, as air temperatures become colder than water temperatures, resulting in seals in general hauling out less. Harbor seals are perhaps the most commonly observed marine mammal in the area of potential effects.

Six harbor seals were observed (and taken) within the Level B Harassment/Monitoring Zone during vibratory activity during Season 1 of the Seattle DOT Pier 62 project. Higher numbers of harbor seals were observed at the Alki and Magnolia sites; however, those animals were outside the Level B zone for vibratory pile removal so were not considered as “taken” under the previous IHA for Season 1. The number of harbor seals observed from all three monitoring locations (Alki, Magnolia and around the construction site) combined ranged from 0 to 11 per day, with an average of 3 harbor seals per day.

Marine mammal monitoring also occurred on 175 days during Seasons 1, 2, 3, and 4 of the Elliott Bay Seawall Project (EBSP), during which 267 harbor seals were documented as takes in the Pier 62 Project area (Anchor QEA 2014, 2015, 2016, and 2017). Numbers of harbor seals observed on the project varied from zero to seven per day, with an average of 1, 1, 2, and 3 observed daily in 2014, 2015, 2016, and 2017, respectively. Additional marine mammal monitoring results in the vicinity of the projects, are as follows:

- 2016 Seattle Test Pile Project: 56 harbor seals were observed over 10 days in the area that corresponds to the upcoming project ZOIs. The maximum number sighted during one day was 13 (Washington State Ferries (WSF) 2016).

- 2012 Seattle Slip 2 Batter Pile Project: Six harbor seals were observed during this one-day project in the area that corresponds to the upcoming project ZOIs (WSF 2012).
- 2012 Seattle Aquarium Pier 60 Project: 281 harbor seals were observed over 29 days in the area that corresponds to the upcoming project ZOIs (HiKARI 2012).

Northern Elephant Seal

No elephant seals were observed during Season 1 of the Seattle DOT Pier 62 project. Marine mammal monitoring also occurred on 175 days during Seasons 1, 2, 3, and 4 of the EBSP, during which no elephant seals were observed in the project area (Anchor QEA 2014, 2015, 2016, and 2017). Similarly, no elephant seals were observed during monitoring for the 2012 Seattle Slip 2 Batter Pile Project, the 2016 Seattle Test Pile Project, or the 2012 Seattle Aquarium Pier 60 Project (WSF 2016).

California Sea Lion

California sea lions are often observed in the area of potential effects. There are four documented haulout sites near Bainbridge Island, approximately six miles from Pier 62, and two documented haulout sites between Bainbridge Island and Magnolia (Jefferies et al. 2000). The nearest documented California sea lion haulout sites are 3 km (2 miles) southwest of Pier 62, although sea lions also make use of docks and buoys in the area.

Eight California sea lions were observed (and taken) within the Level B Harassment/Monitoring Zone during vibratory activity during Season 1 of the Seattle DOT Pier 62 project. Higher numbers of California sea lions were observed at the Alki and Magnolia sites; however, those animals were outside the Level B zone for vibratory pile removal so were not considered as “taken” under the previous IHA for Season 1. The number of sea lions observed

from all three monitoring locations (Alki, Magnolia and around the construction site) combined ranged from 0 to 13 per day, with an average of 8 sea lions per day.

Marine mammal monitoring also occurred on 175 days during Seasons 1, 2, 3, and 4 of the EBSP, during which 951 California sea lions were documented as takes in the project area (Anchor QEA 2014, 2015, 2016, and 2017). California sea lions were frequently observed (average seven per day in 2014 and 2015, three per day in 2016 and 2017, and a maximum of 15 over a day) hauled out on two navigational buoys within the project area (near Alki Point) and swimming along the shoreline. Additional marine mammal monitoring results in the vicinity of the projects, are as follows:

- 2016 Seattle Test Pile project: 12 California sea lions were observed over 10 days in the area that corresponds to the upcoming project ZOIs. The maximum number sighted during one day was four (WSF 2016).
- 2012 Seattle Slip 2 Batter Pile project: 15 California sea lions were observed during this one-day project in the area that corresponds to the upcoming project ZOIs (WSF 2012).
- 2012 Seattle Aquarium Pier 60 project: 382 California sea lions were observed over 29 days in the area that corresponds to the upcoming project ZOIs. The maximum number sighted during one day was 37; however seals, may have been double counted during these observations (HiKARI 2012).

Steller Sea Lion

Steller sea lions are a rare visitor to the Pier 62 area of potential effects. Steller sea lions use haulout locations in Puget Sound. The nearest haulout to the project area is located approximately six miles away (9.66 km). This haulout is composed of net pens offshore of the

south end of Bainbridge Island. The population of Steller sea lions at this haulout has been estimated at less than 100 individuals (Jeffries *et al.* 2000).

No steller sea lions were observed during Season 1 of the Seattle DOT Pier 62 project. Marine mammal monitoring occurred on 175 days during Seasons 1, 2, 3, and 4 of the EBSF, during which three Steller sea lions were observed and documented as takes in the project area (Anchor QEA 2014, 2015, 2016, and 2017).

No Steller sea lions were observed during monitoring for the 2012 Seattle Slip 2 Batter Pile Project or the 2016 Seattle Test Pile Project (WSF 2016).

Killer Whale

The Eastern North Pacific SRKW and West Coast Transient (transient) stocks of killer whale may be found near the project site. The SRKW live in three family groups known as the J, K and L pods. The Southern Residents are listed as endangered under the ESA. Transient killer whales generally occur in smaller (less than 10 individuals), less structured pods (NMFS 2013). According to the Center for Whale Research (CWR) (2015), they tend to travel in small groups of one to five individuals, staying close to shorelines, often near seal rookeries when pups are being weaned. The transient killer whale sightings have become more common since mid-2000. Unlike the SRKW pods, transients may be present in an area for hours or days as they hunt pinnipeds.

A long-term database maintained by the Whale Museum contains sightings and geospatial locations of SRKWs, among other marine mammals, in inland waters of Washington State (Osborne 2008). Data are largely based on opportunistic sightings from a variety of sources (*i.e.*, public reports, commercial whale watching, Soundwatch, Lime Kiln State Park land-based observations, and independent research reports), but the database is regarded as a robust but

difficult to quantify inventory of occurrences. The data provide the most comprehensive assemblage of broad-scale habitat use by the SRKW in inland waters.

Based on reports from 1990 to 2008, the greatest number of unique killer whale sighting-days near or in the area of potential effects occurred from November through January, although observations were made during all months except May (Osborne 2008). Most observations were of SRKWs passing west of Alki Point (82 percent of all observations), which lies on the edge or outside the area of potential effects; this pattern is potentially due to the high level of human disturbance or highly degraded habitat features currently found within Elliott Bay. J Pod, with an estimated 23 members, is the pod most likely to appear year-round near the San Juan Islands, in the lower Puget Sound near Seattle, and in Georgia Strait at the mouth of the Fraser River. J Pod tends to frequent the west side of San Juan Island in mid to late spring (CWR 2011, 2017).

An analysis of sightings in 2011 described an estimated 93 sightings of SRKWs near the area of potential effects (Whale Museum 2011). During this same analysis period, 12 transient killer whales were also observed near the area of potential effects. The majority of all sightings in this area are of groups of killer whales moving through the main channel between Bainbridge Island and Elliott Bay and outside the area of potential effects (Whale Museum 2011). The purely descriptive format of these observations makes it impossible to discern what proportion of the killer whales observed entered the area of potential effects; however, it is assumed that individuals do enter this area on occasion.

No killer whales were observed during Season 1 of the Seattle DOT Pier 62 project. Marine mammal monitoring also occurred on 175 days during Seasons 1, 2, 3, and 4 (2014, 2015, 2016, and 2017) of the EBSP, during which two killer whales were documented as takes in the project area (unknown if SRKW or transient), and one pod of six whales was also observed

in Elliott Bay more than 30 minutes before or after pile driving activity (no take documented; Anchor QEA 2014, 2015, 2016, 2017). This pod of six whales were not identified as SRKW or transients.

During the 2016 Seattle Test Pile project, 0 SRKW were observed over 10 days in the area that corresponds to the upcoming project ZOIs (WSF 2016). During the 2012 Seattle Slip 2 Batter Pile project, 0 SRKW were observed during this one day project in the area that corresponds to the upcoming project ZOIs (WSF 2012). On February 5, 2016, a pod of up to 7 transients were reported in the area (Orca Network Archive Report 2016a).

Long-Beaked Common Dolphin

No long-beaked common dolphins were observed during Season 1 of the Seattle DOT Pier 62 project. Marine mammal monitoring also occurred on 175 days during Seasons 1, 2, 3, and 4 (2014, 2015, 2016, and 2017) of the EBSP, during which no long-beaked common dolphins were observed in the project area (Anchor QEA 2014, 2015, 2016, 2017).

No long-beaked common dolphins were observed during monitoring for the 2012 Seattle Slip 2 Batter Pile Project, the 2016 Seattle Test Pile Project, or the 2012 Seattle Aquarium Pier 60 project. However, there were reported sightings in the Puget Sound in the summer of 2016. Beginning on June 16, long-beaked common dolphins were observed near Victoria, British Columbia. Over the following weeks, a pod of 15 to 20 (including a calf) was observed in central and southern Puget Sound. They were positively identified as long-beaked common dolphins (Orca Network 2016a). This is the first confirmed observation of a pod of long-beaked common dolphins in Washington waters—NMFS states that as of 2012, long-beaked common dolphins had not been observed during surveys in Washington waters (Carretta *et al.* 2016).

Two individual long-beaked common dolphins were observed in 2011, one in August and one in September (Whale Museum 2015).

Bottlenose Dolphin

NOAA offshore surveys from 1991 to 2014 resulted in no sightings during study transects off the Oregon or Washington coasts (NOAA 2017d). However, in October 2017, multiple sightings of a bottlenose dolphin were reported to Orca Network throughout the Puget Sound and in Elliott Bay. Two bottlenose dolphins were observed in Elliott Bay in one week of monitoring (WSDOT 2017) and a group of seven dolphins were observed in 2017 and were positively identified as part of the CA coastal stock (Cascadia Research Collective, 2017).. It is acknowledged that bottlenose dolphins could occur within the project area.

No bottlenose dolphins were observed during Season 1 of the Seattle DOT Pier 62 project. In addition, no bottlenose dolphins were observed during monitoring for the EBSP, the 2012 Seattle Slip 2 Batter Pile Project or the 2016 Seattle Test Pile Project (Anchor QEA 2014, 2015, 2016, and 2017; WSF 2012, 2016).

Gray Whale

Gray whale sightings are typically reported in February through May and include an observation of a gray whale off the ferry terminal at Pier 52 heading toward the East Waterway in March 2010 (CWR 2011). Three gray whales were observed near the project area during 2011 (Whale Museum 2011), but the narrative format of the observations make it difficult to discern whether these individuals entered the area of potential effects. It is assumed that gray whales might rarely occur in the area of potential effects.

No gray whales were observed during Season 1 of the Seattle DOT Pier 62 project. No gray whales were observed during monitoring for Seasons 1, 2,3, or 4 of the EBSP (Anchor QEA

2014, 2015, 2016, and 2017), the 2012 Seattle Slip 2 Batter Pile Project, the 2016 Seattle Test Pile Project, or the 2012 Seattle Aquarium Pier 60 Project (Anchor QEA 2014, 2015, 2016; WSF 2016a).

Humpback Whale

Prior to 2016, humpback whales were listed under the ESA as an endangered species worldwide. Following a 2015 global status review (Bettridge *et al.*, 2015), NMFS established 14 distinct population segments (DPS) with different listing statuses (81 FR 62259; September 8, 2016) pursuant to the ESA. The DPSs that occur in U.S. waters do not necessarily equate to the existing stocks designated under the MMPA and shown in Table 3. Because MMPA stocks cannot be portioned, *i.e.*, parts managed as ESA-listed while other parts managed as not ESA-listed, until such time as the MMPA stock delineations are reviewed in light of the DPS designations, NMFS considers the existing humpback whale stocks under the MMPA to be endangered and depleted for MMPA management purposes (*e.g.*, selection of a recovery factor, stock status). Within U.S. west coast waters, three current DPSs may occur: the Hawaii DPS (not listed), Mexico DPS (threatened), and Central America DPS (endangered).

Humpback whales are only rare visitors to Puget Sound. There is evidence of increasing numbers in recent years (Falcone *et al.* 2005). A rare encounter with one and possibly two humpbacks occurred in Hood Canal (well away from the area of potential effects) as recently as February 2012 (Whale Museum 2012). Humpbacks do not visit Puget Sound every year and are considered rare in the area of potential effects (Whale Museum 2011); however, they have the potential to occur at least during the Pier 62 Project construction period.

No humpback whales were observed during Season 1 of the Seattle DOT Pier 62 project. Marine mammal monitoring also occurred on 175 days during Seasons 1, 2, 3, and 4 (2014,

2015, 2016, and 2017) of the EBSP, during which two humpback whales were observed in the project area (Anchor QEA 2014, 2015, 2016, and 2017). In addition, no humpback whales were observed during monitoring for the 2012 Seattle Slip 2 Batter Pile Project, the 2016 Seattle Test Pile Project, or the 2012 Seattle Aquarium Pier 60 Project (WSF 2016a).

Minke Whale

Minke whales are relatively common in the San Juan Islands and Strait of Juan de Fuca (especially around several of the banks in both the central and eastern Strait), but are relatively rare in Puget Sound (WSF 2016a). No minke whales were observed during Season 1 of the Seattle DOT Pier 62 project. No minke whales were observed during monitoring for Season 1, 2, 4, or 4 of the EBSP, the 2012 Seattle Slip 2 Batter Pile Project, the 2016 Seattle Test Pile Project, or the 2012 Seattle Aquarium Pier 60 Project (Anchor QEA 2014, 2015, 2016; WSF 2016).

Harbor Porpoise and Dall's Porpoise

No harbor porpoise or Dall's porpoise were observed during Season 1 of the Seattle DOT Pier 62 project. Marine mammal monitoring occurred on 175 days during Seasons 1, 2, 3, and 4 (2014, 2015, 2016, and 2017) of the EBSP, during which one harbor porpoise was observed and documented as a take in the project area; no Dall's porpoises were observed (Anchor QEA 2014, 2015, 2016, 2017).

During the 2012 Seattle Aquarium Pier 60 Project, five harbor porpoises and one Dall's porpoise were observed over 29 days in the area that corresponds to the upcoming project ZOIs, with a maximum of three observed in one day (HiKARI 2012). Neither harbor porpoise nor Dall's porpoise were observed during monitoring for the 2012 Seattle Slip 2 Batter Pile Project or the 2016 Seattle Test Pile Project (WSF 2016).

Marine Mammal Hearing

Hearing is the most important sensory modality for marine mammals underwater, and exposure to anthropogenic sound can have deleterious effects. To appropriately assess the potential effects of exposure to sound, it is necessary to understand the frequency ranges marine mammals are able to hear. Current data indicate that not all marine mammal species have equal hearing capabilities (*e.g.*, Richardson *et al.* 1995; Wartzok and Ketten 1999; Au and Hastings 2008). To reflect this, Southall *et al.* (2007) recommended that marine mammals be divided into functional hearing groups based on directly measured or estimated hearing ranges on the basis of available behavioral response data, audiograms derived using auditory evoked potential techniques, anatomical modeling, and other data. Note that no direct measurements of hearing ability have been successfully completed for mysticetes (*i.e.*, low-frequency cetaceans). Subsequently, NMFS (2016a) described generalized hearing ranges for these marine mammal hearing groups. Generalized hearing ranges were chosen based on the approximately 65 dB threshold from the normalized composite audiograms, with the exception for lower limits for low-frequency cetaceans where the lower bound was deemed to be biologically implausible and the lower bound from Southall *et al.* (2007) retained. The functional groups and the associated frequencies are indicated below (note that these frequency ranges correspond to the range for the composite group, with the entire range not necessarily reflecting the capabilities of every species within that group):

- Low-frequency cetaceans (mysticetes): generalized hearing is estimated to occur between approximately 7 hertz (Hz) and 35 kilohertz (kHz);

- Mid-frequency cetaceans (larger toothed whales, beaked whales, and most delphinids): generalized hearing is estimated to occur between approximately 150 Hz and 160 kHz;
- High-frequency cetaceans (porpoises, river dolphins, and members of the genera *Kogia* and *Cephalorhynchus*; including two members of the genus *Lagenorhynchus*, on the basis of recent echolocation data and genetic data): generalized hearing is estimated to occur between approximately 275 Hz and 160 kHz;
- Pinnipeds in water; Phocidae (true seals): generalized hearing is estimated to occur between approximately 50 Hz to 86 kHz; and
- Pinnipeds in water; Otariidae (eared seals and sea lions): generalized hearing is estimated to occur between 60 Hz and 39 kHz.

The pinniped functional hearing group was modified from Southall *et al.* (2007) on the basis of data indicating that phocid species have consistently demonstrated an extended frequency range of hearing compared to otariids, especially in the higher frequency range (Hemilä *et al.*, 2006; Kastelein *et al.*, 2009; Reichmuth and Holt, 2013).

For more detail concerning these groups and associated frequency ranges, please see NMFS (2016a) for a review of available information. Twelve marine mammal species (8 cetacean and 4 pinniped (2 otariid and 2 phocid) species) have the reasonable potential to co-occur with the proposed survey activities. Please refer to Table 3. Of the cetacean species that may be present, three are classified as low-frequency cetaceans (*i.e.*, all mysticete species), three are classified as mid-frequency cetaceans (*i.e.*, all delphinid and ziphiid species), and two are classified as high-frequency cetaceans (*i.e.*, harbor and Dall's porpoise).

Potential Effects of Specified Activities on Marine Mammals and their Habitat

This section includes a summary and discussion of the ways that components of the specified activity may impact marine mammals and their habitat. The “Estimated Take by Incidental Harassment” section later in this document will include a quantitative analysis of the number of individuals that are expected to be taken by this activity. The “Negligible Impact Analysis and Determination” section will consider the content of this section, the “Estimated Take by Incidental Harassment” section, and the “Proposed Mitigation” section, to draw conclusions regarding the likely impacts of these activities on the reproductive success or survivorship of individuals and how those impacts on individuals are likely to impact marine mammal species or stocks.

The Seattle DOT’s Pier 62 Project using in-water pile driving and pile removal could adversely affect marine mammal species and stocks by exposing them to elevated noise levels in the vicinity of the activity area.

Exposure to high intensity sound for a sufficient duration may result in auditory effects such as a noise-induced threshold shift (TS)—an increase in the auditory threshold after exposure to noise (Finneran *et al.* 2005). Factors that influence the amount of threshold shift include the amplitude, duration, frequency content, temporal pattern, and energy distribution of noise exposure. The magnitude of hearing threshold shift normally decreases over time following cessation of the noise exposure. The amount of threshold shift just after exposure is the initial threshold shift. If the threshold shift eventually returns to zero (*i.e.*, the threshold returns to the pre-exposure value), it is a temporary threshold shift (Southall *et al.* 2007).

Threshold Shift (noise-induced loss of hearing) – When animals exhibit reduced hearing sensitivity (*i.e.*, sounds must be louder for an animal to detect them) following exposure to an

intense sound or sound for long duration, it is referred to as TS. An animal can experience temporary threshold shift (TTS) or permanent threshold shift (PTS). TTS can last from minutes or hours to days (*i.e.*, there is complete recovery), can occur in specific frequency ranges (*i.e.*, an animal might only have a temporary loss of hearing sensitivity between the frequencies of 1 and 10 kHz), and can be of varying amounts (for example, an animal's hearing sensitivity might be reduced initially by only 6 dB or reduced by 30 dB). PTS is permanent, but some recovery is possible. PTS can also occur in a specific frequency range and amount as mentioned above for TTS.

For marine mammals, published data are limited to the captive bottlenose dolphin, beluga, harbor porpoise, and Yangtze finless porpoise (Finneran *et al.*, 2000, 2002, 2003, 2005, 2007, 2010a, 2010b; Finneran and Schlundt, 2010; Lucke *et al.*, 2009; Mooney *et al.*, 2009a, 2009b; Popov *et al.*, 2011a, 2011b; Kastelein *et al.*, 2012a; Schlundt *et al.*, 2000; Nachtigall *et al.*, 2003, 2004). For pinnipeds in water, data are limited to measurements of TTS in harbor seals, an elephant seal, and California sea lions (Kastak *et al.*, 1999, 2005; Kastelein *et al.*, 2012b).

Lucke *et al.* (2009) found a TS of a harbor porpoise after exposing it to airgun noise with a received SPL at 200.2 dB (peak-to-peak) re: 1 μ Pa, which corresponds to a sound exposure level (SEL) of 164.5 dB re: 1 μ Pa² s after integrating exposure. . Because the airgun noise is a broadband impulse, one cannot directly determine the equivalent of rms SPL from the reported peak-to-peak SPLs. However, applying a conservative conversion factor of 16 dB for broadband signals from seismic surveys (McCauley *et al.* 2000) to correct for the difference between peak-to-peak levels reported in Lucke *et al.* (2009) and rms SPLs, the rms SPL for TTS would be approximately 184 dB re: 1 μ Pa, and the received levels associated with PTS (Level A

harassment) would be higher. However, NMFS recognizes that TTS of harbor porpoises is lower than other cetacean species empirically tested (Finneran and Schlundt 2010; Finneran *et al.* 2002; Kastelein and Jennings 2012).

Marine mammal hearing plays a critical role in communication with conspecifics, and interpretation of environmental cues for purposes such as predator avoidance and prey capture. Depending on the degree (elevation of threshold in dB), duration (*i.e.*, recovery time), and frequency range of TTS, and the context in which it is experienced, TTS can have effects on marine mammals ranging from discountable to serious (similar to those discussed in auditory masking, below). For example, a marine mammal may be able to readily compensate for a brief, relatively small amount of TTS in a non-critical frequency range that occurs during a time where ambient noise is lower and there are not as many competing sounds present. Alternatively, a larger amount and longer duration of TTS sustained during time when communication is critical for successful mother/calf interactions could have more serious impacts. Also, depending on the degree and frequency range, the effects of PTS on an animal could range in severity, although it is considered generally more serious because it is a permanent condition. Of note, reduced hearing sensitivity as a simple function of aging has been observed in marine mammals, as well as humans and other taxa (Southall *et al.* 2007), so one can infer that strategies exist for coping with this condition to some degree, though likely not without cost.

Masking - In addition, chronic exposure to excessive, though not high-intensity, noise could cause masking at particular frequencies for marine mammals that utilize sound for vital biological functions (Clark *et al.* 2009). Acoustic masking is when other noises such as from human sources interfere with animal detection of acoustic signals such as communication calls, echolocation sounds, and environmental sounds important to marine mammals. Therefore, under

certain circumstances, marine mammals whose acoustical sensors or environment are being severely masked could also be impaired from maximizing their performance fitness in survival and reproduction.

Masking occurs at the frequency band that the animals utilize. Therefore, since noise generated from vibratory pile driving activity is mostly concentrated at low frequency ranges, it may have less effect on high frequency echolocation sounds by odontocetes (toothed whales). However, lower frequency man-made noises are more likely to affect detection of communication calls and other potentially important natural sounds such as surf and prey noise. It may also affect communication signals when they occur near the noise band and thus reduce the communication space of animals (*e.g.*, Clark *et al.* 2009) and cause increased stress levels (*e.g.*, Foote *et al.* 2004; Holt *et al.* 2009).

Unlike TS, masking, which can occur over large temporal and spatial scales, can potentially affect the species at population, community, or even ecosystem levels, as well as individual levels. Masking affects both senders and receivers of the signals and could have long-term chronic effects on marine mammal species and populations. Recent science suggests that low frequency ambient sound levels have increased by as much as 20 dB (more than three times in terms of sound pressure level) in the world's ocean from pre-industrial periods, and most of these increases are from distant shipping (Hildebrand 2009). For Seattle DOT's Pier 62 Project, noises from vibratory pile driving and pile removal contribute to the elevated ambient noise levels in the project area, thus increasing potential for or severity of masking. Baseline ambient noise levels in the vicinity of project area are high due to ongoing shipping, construction and other activities in the Puget Sound.

Behavioral disturbance - Finally, marine mammals' exposure to certain sounds could lead to behavioral disturbance (Richardson *et al.*, 1995), such as: changing durations of surfacing and dives, number of blows per surfacing, or moving direction and/or speed; reduced/increased vocal activities; changing/cessation of certain behavioral activities (such as socializing or feeding); visible startle response or aggressive behavior (such as tail/fluke slapping or jaw clapping); avoidance of areas where noise sources are located; and/or flight responses (*e.g.*, pinnipeds flushing into water from haulouts or rookeries).

The onset of behavioral disturbance from anthropogenic noise depends on both external factors (characteristics of noise sources and their paths) and the receiving animals (hearing, motivation, experience, demography) and is also difficult to predict (Southall *et al.*, 2007). Currently NMFS uses a received level of 160 dB re 1 μ Pa (rms) to predict the onset of behavioral harassment from impulse noises (such as impact pile driving), and 120 dB re 1 μ Pa (rms) for continuous noises (such as vibratory pile driving). For the Seattle DOT's Pier 62 Project, both of these noise levels are considered for effects analysis because Seattle DOT plans to use both impact and vibratory pile driving, as well as vibratory pile removal.

The biological significance of many of these behavioral disturbances is difficult to predict, especially if the detected disturbances appear minor. However, the consequences of behavioral modification could be biologically significant if the change affects growth, survival, and/or reproduction, which depends on the severity, duration, and context of the effects.

Habitat - The primary potential impacts to marine mammal habitat are associated with elevated sound levels produced by pile driving and removal associated with marine mammal prey species. However, other potential impacts to the surrounding habitat from physical disturbance are also possible. Prey species for the various marine mammals include marine

invertebrates and fish species. Short-term effects would occur to marine invertebrates during removal of existing piles. This effect is expected to be minor and short-term on the overall population of marine invertebrates in Elliott Bay. Construction will also have temporary effects on salmonids and other fish species in the project area due to disturbance, turbidity, noise, and the potential resuspension of contaminants. All in-water work will occur during the designated in-water work window, to minimize effects on juvenile salmonids with the exception of some Chinook salmon that may be found along the seawall into October. Additionally, marine resident fish species are only present in limited numbers along the seawall during the in-water work season and primarily occur during the summer months, when work would not be occurring (Anchor QEA 2012).

SPLs from impact pile driving has the potential to injure or kill fish in the immediate area. These few isolated fish mortality events are not anticipated to have a substantial effect on prey species population or their availability as a food resource for marine mammals.

Studies also suggest that larger fish are generally less susceptible to death or injury than small fish. Moreover, elongated forms that are round in cross section are less at risk than deep-bodied forms. Orientation of fish relative to the shock wave may also affect the extent of injury. Open water pelagic fish (*e.g.*, mackerel) seem to be less affected than reef fishes. The results of most studies are dependent upon specific biological, environmental, explosive, and data recording factors.

The huge variation in fish populations, including numbers, species, sizes, and orientation and range from the detonation point, makes it very difficult to accurately predict mortalities at any specific site of detonation. Most fish species experience a large number of natural

mortalities, especially during early life-stages, and any small level of mortality caused by the Seattle DOT's impact pile driving will likely be insignificant to the population as a whole.

For non-impulsive sound such as that of vibratory pile driving, experiments have shown that fish can sense both the strength and direction of sound (Hawkins 1981). Primary factors determining whether a fish can sense a sound signal, and potentially react to it, are the frequency of the signal and the strength of the signal in relation to the natural background noise level.

The level of sound at which a fish will react or alter its behavior is usually well above the detection level. Fish have been found to react to sounds when the sound level increased to about 20 dB above the detection level of 120 dB (Ona 1988); however, the response threshold can depend on the time of year and the fish's physiological condition (Engas *et al.* 1993).

During construction activity of the Pier 62 Project, only a small fraction of the available habitat would be ensonified at any given time. Disturbance to fish species would be short-term and fish would return to their pre-disturbance behavior once the pile driving activity ceases. Thus, the proposed construction would have little, if any, impact on the abilities of marine mammals to feed in the area where construction work is proposed.

Finally, the time of the proposed construction activity would avoid the spawning season of the ESA-listed salmonid species between March and July.

Short-term turbidity is a water quality effect of most in-water work, including pile driving. Cetaceans are not expected to be close enough to the Pier 62 Project to experience turbidity, and any pinnipeds will be transiting the terminal area and could avoid localized areas of turbidity. Therefore, the impact from increased turbidity levels is expected to be discountable to marine mammals.

For these reasons, any adverse effects to marine mammal habitat in the area from the Seattle DOT's proposed Pier 62 would not be significant.

Estimated Take

This section provides an estimate of the number of incidental takes proposed for authorization through this IHA, which informed both NMFS's consideration of whether the number of takes is "small" and the negligible impact determination.

Harassment is the only type of take expected to result from these activities. Except with respect to certain activities not pertinent here, section 3(18) of the MMPA defines "harassment" as: any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment).

Authorized takes would primarily be by Level B harassment, as exposure to pile driving activities has the potential to result in disruption of behavioral patterns for individual marine mammals. There is also some potential for auditory injury (Level A harassment) to result, primarily for high frequency species due to larger predicted auditory injury zones. Auditory injury is unlikely to occur for mid-frequency species and most pinnipeds. The proposed mitigation and monitoring measures (*i.e.*, shutdown zones, use of a bubble curtain, etc. as discussed in detail below in "Proposed Mitigation" section), are expected to minimize the severity of such taking to the extent practicable. Below we describe how the take is estimated.

Described in the most basic way, we estimate take by considering: 1) acoustic thresholds above which NMFS believes the best available science indicates marine mammals will be

behaviorally harassed or incur some degree of permanent hearing impairment; 2) the area or volume of water that will be ensonified above these levels in a day; 3) the density or occurrence of marine mammals within these ensonified areas; and, 4) and the number of days of activities. Below, we describe these components in more detail and present the proposed take estimates.

Acoustic Thresholds

Using the best available science, NMFS has developed acoustic thresholds that identify the received level of underwater sound above which exposed marine mammals would be reasonably expected to be behaviorally harassed (equated to Level B harassment) or to incur PTS of some degree (equated to Level A harassment).

Level B Harassment for non-explosive sources – Though significantly driven by received level, the onset of behavioral disturbance from anthropogenic noise exposure is also informed to varying degrees by other factors related to the source (*e.g.*, frequency, predictability, duty cycle), the environment (*e.g.*, bathymetry), and the receiving animals (hearing, motivation, experience, demography, behavioral context) and can be difficult to predict (Southall *et al.* 2007, Ellison *et al.* 2011). Based on what the available science indicates and the practical need to use a threshold based on a factor that is both predictable and measurable for most activities, NMFS uses a generalized acoustic threshold based on received level to estimate the onset of behavioral harassment. NMFS predicts that marine mammals are likely to be behaviorally harassed in a manner we consider Level B harassment when exposed to underwater anthropogenic noise above received levels of 120 dB re 1 μ Pa root mean square (rms) for continuous (*e.g.*, vibratory pile-driving, drilling) sources and above 160 dB re 1 μ Pa (rms) for non-explosive impulsive (*e.g.*, impact pile driving) sources. Seattle DOT's proposed activity includes the use of continuous

(vibratory pile driving and removal) and impulsive (impact pile driving) sources, and therefore the 120 and 160 dB re 1 μ Pa (rms) are applicable.

Level A harassment for non-explosive sources - NMFS's Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (NMFS, 2016a) identifies dual criteria to assess auditory injury (Level A harassment) to five different marine mammal groups (based on hearing sensitivity) as a result of exposure to noise from two different types of sources (impulsive or non-impulsive). Seattle DOT's proposed activity includes the use of continuous (vibratory pile driving and removal) and impulsive (impact pile driving) sources.

These thresholds were developed by compiling and synthesizing the best available science and soliciting input multiple times from both the public and peer reviewers to inform the final product, and are provided in Table 4 below. The references, analysis, and methodology used in the development of the thresholds are described in NMFS 2016 Technical Guidance, which may be accessed at: <https://www.fisheries.noaa.gov/resource/document/underwater-acoustic-thresholds-onset-permanent-and-temporary-threshold-shifts>
<http://www.nmfs.noaa.gov/pr/acoustics/guidelines.htm>.

Table 4. Thresholds Identifying the Onset of Permanent Threshold Shift.

Hearing Group	PTS Onset Thresholds	
	Impulsive	Non-impulsive
Low-Frequency (LF) Cetaceans	$L_{pk,flat}$: 219 dB $L_{E,LF,24h}$: 183 dB	$L_{E,LF,24h}$: 199 dB
Mid-Frequency (MF) Cetaceans	$L_{pk,flat}$: 230 dB $L_{E,MF,24h}$: 185 dB	$L_{E,MF,24h}$: 198 dB
High-Frequency (HF) Cetaceans	$L_{pk,flat}$: 202 dB $L_{E,HF,24h}$: 155 dB	$L_{E,HF,24h}$: 173 dB
Phocid Pinnipeds (PW) (Underwater)	$L_{pk,flat}$: 218 dB $L_{E,PW,24h}$: 185 dB	$L_{E,PW,24h}$: 201 dB
Otariid Pinnipeds (OW) (Underwater)	$L_{pk,flat}$: 232 dB $L_{E,OW,24h}$: 203 dB	$L_{E,OW,24h}$: 219 dB

* Dual metric acoustic thresholds for impulsive sounds: Use whichever results in the largest isopleth for calculating PTS onset. If a non-impulsive sound has the potential of exceeding the peak sound pressure level thresholds associated with impulsive sounds, these thresholds should also be considered.

Note: Peak sound pressure (Lpk) has a reference value of 1 μ Pa, and cumulative sound exposure level (LE) has a reference value of 1 μ Pa²s. In this Table, thresholds are abbreviated to reflect American National Standards Institute standards (ANSI 2013). However, peak sound pressure is defined by ANSI as incorporating frequency weighting, which is not the intent for this Technical Guidance. Hence, the subscript “flat” is being included to indicate peak sound pressure should be flat weighted or unweighted within the generalized hearing range. The subscript associated with cumulative sound exposure level thresholds indicates the designated marine mammal auditory weighting function (LF, MF, and HF cetaceans, and PW and OW pinnipeds) and that the recommended accumulation period is 24 hours. The cumulative sound exposure level thresholds could be exceeded in a multitude of ways (*i.e.*, varying exposure levels and durations, duty cycle). When possible, it is valuable for action proponents to indicate the conditions under which these acoustic thresholds will be exceeded.

Ensonified Area

Here, we describe operational and environmental parameters of the activity that fed into identifying the area ensonified above the acoustic thresholds.

Background noise is the sound level that would exist without the proposed activity (pile driving and removal, in this case), while ambient sound levels are those without human activity (NOAA 2009). The marine waterway of Elliott Bay is very active, and human factors that may contribute to background noise levels include ship traffic. Natural actions that contribute to ambient noise include waves, wind, rainfall, current fluctuations, chemical composition, and biological sound sources (*e.g.*, marine mammals, fish, and shrimp; Carr *et al.* 2006).

Background noise levels were compared to the relevant threshold levels designed to protect marine mammals to determine the Level B Harassment Zones for noise sources. Based on hydroacoustic monitoring conducted during Season 1 of the Pier 62 Project to determine background noise in the vicinity of the project, the background level of 124 dB rms was used to calculate the attenuation for vibratory pile driving and removal in Season 2 (Greenbusch Group 2018). Although NMFS’s harassment threshold is typically 120 dB for continuous noise, recent site-specific measurements collected by The Greenbusch Group (2018) as required by the Season

1 IHA indicate that ambient sound levels are typically higher than this sound level and ranged from 117 dB to 145 dB. Therefore, we used the, 124 dB rms (also the same noise level as Season 1), as the relevant threshold for Season 2 of the Seattle DOT Pier 62 project, assuming that any noise generated by the project below 124 dB would be subsumed by the existing background noise and have little likelihood of causing additional behavioral disturbance.

The source level of vibratory removal of 14-in timber piles is based on hydroacoustic monitoring measurements conducted at the Pier 62 project site during Season 1 vibratory removal (Greenbusch Group 2018). The recorded source level ranged from 140 to 169 dB rms re 1 micropascal (μPa) at 10 meters (m) from the pile, with the 75th percentile at 161 dB rms. This level, 161 dB rms, was chosen as the source value for vibratory timber removal in Season 2 because it is a conservative estimate of potential noise generation; 75 percent of the timber pile removal noise generated in Season 1 was on average lower than 161 dB rms. The sound source levels for installation of the 30-in steel piles and 24-in template piles are based on surrogate data compiled by WSDOT. This value was also used for other pile driving projects (*e.g.*, WSDOT Seattle Multimodal Construction Project - Colman Dock (82 FR 31579; July 7, 2017)) in the same area as the Seattle Pier 62 project. In February of 2016, WSDOT conducted a test pile project at Colman Dock. The measured results from Colman Dock were used for that project and also here to provide source levels for the prediction of isopleths ensonified over thresholds for the Seattle Pier 62 project. The results showed that the sound pressure level (SPL) root-mean-square (rms) for impact pile driving of a 36-in steel pile is 189 dB re 1 μPa at 14 m from the pile (WSDOT 2016b). This value is also used for impact driving of the 30-in steel piles, which is a precautionary approach. Source level of vibratory pile driving of 36-in steel piles is based on test pile driving at Port Townsend in 2010 (Laughlin 2011). Recordings of vibratory pile driving

were made at a distance of 10 m from the pile. The results show that the SPLrms for vibratory pile driving of 36-in steel pile was 177 dB re 1 μ Pa (WSDOT 2016a). The source sound level of 177 dB is used for vibratory steel installation of 30-in piles and 24-in template piles. The template pile activity occurs in conjunction with vibratory installation of 30-in steel piles. As such, the template pile activity is conservatively included as part of 30-in vibratory steel installation for the purposes of estimating take and monitoring the project activities. Sound generated by template pile activity (removal and installation of 24-in steel piles) is expected to be quieter than sound generated during vibratory steel installation of 30-in piles, because the piles are smaller and do not need to be driven as deep as structural, permanent 30-in steel piles.

The method of incidental take requested is Level B acoustical harassment of marine mammals within the 160 dB rms disturbance threshold (impact pile driving); the 120 dB rms disturbance threshold (vibratory pile driving); and the 120 dB rms disturbance threshold for vibratory removal of piles. Therefore, three different Level B Harassment/Monitoring Zones were established and will be in place during pile driving installation or removal (Table 5). Measured ambient noise levels in the area are 124 dB; therefore, NMFS only considers take likely to occur in the area ensonified above 124 dB, as pile driving noise below 124 dB would likely be masked or their impacts diminished such that any reactions would not be considered take as a result of the high ambient noise levels.

For the Level B Harassment/Monitoring Zones, sound waves propagate in all directions when they travel through water until they dissipate to background levels or encounter barriers that absorb or reflect their energy, such as a landmass. Therefore, the area of the Level B Harassment/Monitoring Zones was determined using land as the boundary on the north, east and south sides of the project. On the west, land was also used to establish the zone for vibratory

driving. From Alki on the south and Magnolia on the north, a straight line of transmission was established out to Bainbridge Island. For impact driving (and vibratory removal), sound dissipates much quicker and the impact zone stays within Elliott Bay. Pile-related construction noise would extend throughout the nearshore and open water environments to just west of Alki Point and a limited distance into the East Waterway of the Lower Duwamish River, a highly industrialized waterway. Because landmasses block in-water construction noise, a “noise shadow” created by Alki Point is expected to be present immediately west of this feature (refer to Seattle DOT’s application for maps depicting the Level B Harassment/Monitoring Zones).

Table 5. Level B Zone Harassment/Monitoring Zones Descriptions and Duration of Activity

Sound Source	Activity	Construction Method	Level B Threshold (m)	Level B Harassment Zones (km²)²	Days of Activity
1	Removal of 14-in Timber Piles	Vibratory ¹	1,848	4.8	10
2	Installation of 30-in Steel Piles and Temporary 24-in Template Steel Piles	Vibratory ¹	54,117	91	53
3	Installation of 30-in Steel Piles	Impact	2,929	2.3	64

Notes:

¹ The Level B thresholds for vibratory installation and removal were calculated to 124 dB rms as the actual ambient noise level rather than 120 dB.

² The Level B Harassment Zones are not based on the distances given but represent actual ensonified area given the surrounding land configuration of Elliott Bay.

When NMFS Technical Guidance (NMFS 2016) was published, in recognition of the fact that ensonified area/volume could be more technically challenging to predict because of the duration component in the new thresholds, we developed a User Spreadsheet that includes tools to help predict a simple isopleth that can be used in conjunction with marine mammal density or occurrence to help predict takes. We note that because of some of the assumptions included in

the methods used for these tools, we anticipate that isopleths produced are typically going to be overestimates of some degree, which will result in some degree of overestimate of Level A harassment take. However, these tools offer the best way to predict appropriate isopleths when more sophisticated 3D modeling methods are not available, and NMFS continues to develop ways to quantitatively refine these tools, and will qualitatively address the output where appropriate. For stationary sources such as vibratory and impact pile driving, NMFS's User Spreadsheet predicts the closest distance at which, if a marine mammal remained at that distance the whole duration of the activity, it would not incur PTS. Inputs used in the User Spreadsheet, and the resulting isopleths/Level A Harassment Zones are reported below.

The PTS isopleths were identified for each hearing group for impact and vibratory installation and removal methods that will be used in the Pier 62 Project. The PTS isopleth distances were calculated using the NMFS acoustic threshold calculator (NMFS 2016), with inputs based on measured and surrogate noise measurements taken during the EBSP and from WSDOT, and estimating conservative working durations (Table 6 and Table 7).

Table 6. NMFS Technical Acoustic Guidance User Spreadsheet Input to Predict PTS Isopleths/Level A Harassment.

USER SPREADSHEET INPUT			
	Sound Source 1	Sound Source 2	Sound Source 3
Spreadsheet Tab Used	A)Vibratory pile driving (removal)	A)Vibratory pile driving (installation)	E.1) Impact pile driving (installation)
Source Level (rms SPL)	161 dB ^a	180 dB ^b	
Source Level (Single Strike/shot SEL)			176 dB ^c
Weighting Factor Adjustment (kHz)	2.5	2.5	2
a) Number of strikes in 1 h			20
a) Activity Duration (h) within 24-h period	8	8	4
Propagation (xLogR)	15	15	15

Distance of source level measurement (meters) ^a	10	10	14
a Greenbusch Group 2018. Pier 62 Project – Draft Acoustic Monitoring Season 1 (2017/2018) Report. Prepared for City of Seattle Department of Transportation. April 9, 2018			
b Source level for 30-in steel piles was from test pile driving at Port Townsend Ferry Terminal in 2010. SPLrms for vibratory pile driving was 177 dB re 1 µPa. and 3 dB was added for use of two hammers.			
c Source information is from the Underwater Sound Level Report: Colman Dock Test Pile Project 2016.			

Table 7. NMFS Technical Acoustic Guidance User Spreadsheet Output for Predicted PTS Isopleths and Level A Harassment Daily Ensonified Areas.

USER SPREADSHEET OUTPUT					
	PTS Isopleth (meters)				
Sound Source Type	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
1 - Vibratory (pile removal)	27.3	2.4	40.4	16.6	1.2
2 - Vibratory (installation)	504.8	44.7	746.4	306.8	21.5
3 - Impact (installation)	88.6	3.2	105.6	47.4	3.5
	Level A Harassment Daily ensonified area (km ²) ^a				
Vibratory (pile removal)	0.001171	0.0000091	0.002564	0.000433	0.0000023
Vibratory (installation)	0.400275	0.003139	0.875111	0.147853	0.000726
Impact (installation)	0.012331	0.000016	0.017517	0.003529	1.92423E-05

Note:

^a Daily ensonified areas were divided by two to only account for the ensonified area within the water and not over land.

Marine Mammal Occurrence and Take Calculation and Estimation

In this section we provide the information about the presence, density, or group dynamics of marine mammals that informed the take calculation and we describe how the marine mammal occurrence information is brought together to produce a quantitative take estimate. In some cases (e.g., harbor seals and California sea lions) we used local monitoring to calculate estimated take; however, We also present take estimates (where available) using the species density data from the 2015 Pacific Navy Marine Species Density Database (U.S. Navy 2015), as a comparison for estimated take of marine mammals. For harbor porpoise, we estimated take using the density

estimates provided in Jefferson *et al.*, 2016 as this is the best available density information for this species.

Where species density is available, take estimates are based on average marine mammal density in the project area multiplied by the area size of ensonified zones within which received noise levels exceed certain thresholds (*i.e.*, Level A and B harassment) from specific activities, then multiplied by the total number of days such activities would occur.

Unless otherwise described, incidental take is estimated by the following equation:

Incidental take estimate = species density * zone of influence * days of pile-related activity

However, adjustments were made for nearly every marine mammal species, whenever their local abundance is known through monitoring during Season 1 activities and other monitoring efforts. In those cases, the local abundance data was used for take calculations for the authorized take instead of general animal density (see below).

Harbor Seal

The take estimate for harbor seals for Pier 62 is based on local seal abundance information using the maximum number of seals (13) sighted in one day during the 2016 Seattle Test Pile project multiplied by the total of 127 pile driving days for the Seattle DOT Pier 62 Project Season 2 for 1,651 seals. Fifty-three of the 127 days of activity would involve installation by vibratory pile driving, which has a much larger Level A Harassment Zone (306.8 m) than the Level A Harassment Zones for vibratory removal (16.6 m) and impact pile driving (47.4 m). Harbor seals may be difficult to observe at greater distances, therefore, during vibratory pile driving, it may not be known how long a seal is present in the Level A Harassment Zone. We estimate that four instances of harbor seals may occur by Level A harassment during these 53 days. Four instances of potential take by Level A harassment was based the local

observational data for harbor seals, the larger ensonified area during vibratory pile driving for installation, and our best professional judgment that an animal would remain within the injury zone for prolonged exposure of intense noise. The instances of take by Level B harassment (1,651 seals) was adjusted to exclude those already counted for instances of take by Level A harassment, so the proposed authorized instances of take by Level B harassment is 1,647 harbor seals.

As a comparison, using U.S. Navy species density estimates (U.S. Navy 2015) for the inland waters of Puget Sound, potential take of harbor seal is shown in Table 8. Based on these calculations, instances of take by Level A is estimated at 10 harbor seals from vibratory pile driving and instances of take by Level B is estimated at 6,107 harbor seals from all sound sources. However, observational data from previous projects on the Seattle waterfront have documented only a fraction of what is calculated using the Navy density estimates for Puget Sound. For example, between zero and seven seals were observed daily for the EBSP and 56 harbor seals were observed over 10 days in the area with the maximum number of 13 harbor seals sighted during the 2016 Seattle Test Pile project (WSF 2016). During marine mammal monitoring for Season 1 of the Seattle DOT Pier 62 Project, 10 harbor seals were observed within the Level B Harassment/Monitoring Zone during vibratory activity. Project activities in Season 1, primarily timber vibratory removal, had a smaller Level B Harassment/Monitoring Zone than vibratory steel installation (the primary activity for Seasons 2), so it is expected that harbor seal observations and takes in Season 2 will be greater and will more closely resemble observational data from other monitoring efforts such as EBSP and Seattle Test Pile Project.

.”

Table 8. Harbor Seal Estimated Take Based on NMSDD Presented for Comparison.

Sound Source	Species Density	Level A ZOI (km²)	Level B ZOI (km²)	Days of Activity	Estimated Take Level A	Estimated Take Level B
1	1.219	0.000176	4.8	10	0	58
2	1.219	0.147853	91	53	10	5,879 (*Adjusted 5,869)
3	1.219	0.003529	2.3	64	0	180

Note:

km² – square kilometers

*Number of Level B takes was adjusted to exclude those already counted for Level A takes.

Northern Elephant Seal

For the Northern elephant seal, the Whale Museum (as cited in WSDOT 2016a) reported one sighting in the relevant area between 2008 and 2014. In addition, based on U.S. Navy species density estimates (U.S. Navy 2015), potential take of northern elephant seal is expected to be zero. Therefore, the Seattle DOT is requesting authorization for an instance of take by Level B harassment of one northern elephant seal.

California Sea Lion

The take estimate of California sea lions for Pier 62 is based on Season 1 marine mammal monitoring for the Seattle DOT Pier 62 Project and four seasons of local sea lion abundance information from the EBSP,. Marine mammal visual monitoring during the EBSP indicates that a maximum of 15 sea lions were observed in a day during 4 years of project monitoring (Anchor QEA 2014, 2015, 2016, 2017). Based on a total of 127 pile driving days for the Seattle Pier 62 project Season 2, it is estimated that up to 1,905 California sea lions (15 sea lions multiplied by 127 days) could be exposed to noise levels associated with “take.” Since the calculated Level A Harassment Zones of otariids are all very small (Table 7), we do not consider it likely that any sea lions would be taken by Level A harassment. Therefore, all California sea lion takes estimated here are expected to be takes by Level B harassment and NMFS proposes to authorize instances of take by Level B harassment of 1,905 California sea lions.

As a comparison, using the U.S. Navy species density estimates (U.S. Navy 2015) for the inland waters of Washington, including Eastern Bays and Puget Sound, potential take of California sea lion is shown in Table 9. The estimated instances of take by Level B harassment is 636 California sea lions. However, the Seattle DOT believes that this estimate is unrealistically low, based on local marine mammal monitoring.

Table 9. California Sea Lion Estimated Take Based on NMSDD Presented for Comparison.

Sound Source	Species Density	Level A ZOI (km ²)	Level B ZOI (km ²)	Days of Activity	Estimated Level A Take	Estimated Level B Take
1	0.1266	2.26E-06	4.8	10	0	6
2	0.1266	0.000726	91	53	0	611
3	0.1266	1.92423E-05	2.3	64	0	19

Note:
km² – square kilometers

Steller Sea Lion

No local monitoring data of Steller sea lions is available. Therefore, the estimated take for Steller sea lions is based on U.S. Navy species density estimates (U.S. Navy 2015), and is shown in Table 10. Since the calculated Level A Harassment Zones of otariids are all very small (Table 7), we do not consider it likely that any Steller sea lions would be taken by Level A harassment. The Seattle DOT is requesting authorization instances of take by Level B harassment of 185 Steller sea lions.

Table 10. Steller Sea Lion Estimated Take Based on NMSDD Presented for Comparison.

Sound Source	Species Density	Level A ZOI (km ²)	Level B ZOI (km ²)	Days of Activity	Estimated Level A Take	Estimated Level B Take
1	0.0368	2.26E-06	4.8	10	0	2
2	0.0368	0.000726	91	53	0	178
3	0.0368	1.92423E-05	2.3	64	0	5

Note:
km² – square kilometers

Southern Resident Killer Whale

The take estimate of SRKW for Pier 62 is based on local data and information from the Center for Whale Research (CWR). J-pod is the pod most likely to appear in the lower Puget Sound near Seattle with a group size of approximately 23 SRKW in 2017, 24 in 2016, and 29 in 2015. (CWR 2017). Therefore, NMFS proposes to authorize instances of take by Level B harassment of 23 SRKW based on a single occurrence of one pod (*i.e.*, J Pod – 23 individuals) that would be most likely to be seen near Seattle. Since the Level A Harassment Zones of mid-frequency cetaceans are small (Table 7), we do not consider it likely that any SRKW would be taken by Level A harassment.

The Seattle DOT will coordinate with the Orca Network and the CWR in an attempt to avoid all take of SRKW, but it may be possible that a group may enter the Level B Harassment/Monitoring Zones before Seattle DOT could shut down due to the larger size of the Level B Harassment/Monitoring Zones particularly during vibratory pile driving (installation).

As a comparison, using the U.S. Navy species density estimates (U.S. Navy 2015) the density for the SRKW is variable across seasons and across the range. The inland water density estimates vary from 0.000000 to 0.000090/km² in summer, 0.001461 to 0.004760/km² in fall, and 0.004761-0.020240/km² in winter. Therefore, estimated takes as shown in Table 11 are based on the highest density estimated during the winter season (0.020240/km²) for the SRKW population. With the variable winter density, estimates can range from 24 to 102 SRKW, with the upper take estimate greater than the estimated population size.

Table 11. Southern Resident Killer Whale Estimated Take Based on NMSDD Presented for Comparison.

Sound Source	Species Density	Level A ZOI (km ²)	Level B ZOI (km ²)	Days of Activity	Estimated Level A Take	Estimated Level B Take
1	0.020240	0.0000091	4.8	10	0	1

2	0.020240	0.003139	91	53	0	98
3	0.020240	0.000016	2.3	64	0	3

Note:
km² – square kilometers

Transient Killer Whale

The take estimate of transient killer whales for Pier 62 is based on local data. Seven transients were reported in the project area (Orca Network Archive Report 2016a). Therefore, NMFS proposes to authorize instances of take by Level B harassment of 42 transient killer whales, which would cover up to 2 groups of up to 7 transient whales entering into the project area and remaining there for three days. Since the Level A Harassment Zones of mid-frequency cetaceans are small (Table 7), we do not consider it likely that any transient killer whales would be taken by Level A harassment.

As a comparison, based on U.S. Navy species density estimates (U.S. Navy 2015), potential take of transient killer whale is shown in Table 12. As with the SRKW, the density estimate of transient killer whales is variable between seasons and regions. Density estimates range from 0.000575 to 0.001582/km² in summer, from 0.001583 to 0.002373/km² in fall, and from 0.000575 to 0.001582/km² in winter. Work could occur throughout summer, fall and winter, so the highest estimate, fall density, was used to conservatively estimate take. For instances of take by Level B harassment, this results in a take estimate of twelve SRKW. However, the Seattle DOT believes that this estimate is low based on local data of seven transients that were reported in the area (Orca Network Archive Report 2016a).

Table 12. Transient Killer Whale Estimated Take Based on NMSDD Presented for Comparison.

Sound Source	Species Density	Level A ZOI (km²)	Level B ZOI (km²)	Days of Activity	Estimated Level A Take	Estimated Level B Take
1	0.002373	0.000004	4.8	10	0	0
2	0.002373	0.003139	91	53	0	12
3	0.002373	0.000016	2.3	64	0	0

Note:
km² – square kilometers

Long-beaked Common Dolphin

The take estimate of Long-beaked common dolphin for Pier 62 is based on local monitoring data.. In 2016, the Orca Network (2016c) reported a pod of up to 20 long-beaked common dolphins. Therefore, the Seattle DOT is requesting authorization for instances of take by Level B harassment of 20 long-beaked common dolphins. Since the Level A Harassment Zones of mid-frequency cetaceans are all very small (Table 7), we do not consider it likely that the long-beaked common dolphin would be taken by Level A harassment. Based on U.S. Navy species density estimates (U.S. Navy 2015), potential instances take of long-beaked common dolphin is expected to be zero; therefore, we believe it more appropriate to use local monitoring data.

Bottlenose Dolphin

The take estimate of bottlenose dolphin for Pier 62 is based on local monitoring data. In 2017 the Orca Network (2017) reported sightings of a bottlenose dolphin in Puget Sound and in Elliott Bay, and WSDOT observed two bottlenose dolphins in one week during monitoring for the Colman Dock Multimodal Project (WSDOT 2017). In addition, a group of seven dolphins were observed in 2017 and were positively identified as part of the CA coastal stock (Cascadia Research Collective, 2017). Bottlenose dolphins typically travel in groups of 2 to 15 in coastal waters (NOAA 2017). Therefore, the Seattle DOT is requesting instances of takes by Level B harassment of seven bottlenose dolphins. Since the Level A Harassment Zones of mid-frequency

cetaceans are all very small (Table 7), we do not consider it likely that the common bottlenose dolphin would be taken by Level A harassment. Based on U.S. Navy species density estimates (U.S. Navy 2015), instances of potential take by Level B harassment of bottlenose dolphin is expected to be zero; therefore, we believe it more appropriate to use local monitoring data.

Harbor Porpoise

Species density estimates from Jefferson *et al.* (2016), is the best available density data available for the potential take of harbor porpoise and is shown in Table 13. Instances of take by Level A harassment is estimated at 32 harbor porpoises and instances of take by Level B harassment is estimated at 3,431 exposures to harbor porpoises. Therefore, NMFS proposes to authorize instances take by Level A harassment of 32 harbor porpoises and instances of take by Level B harassment of 3,431 harbor porpoises.

Table 13. Harbor Porpoise Estimated Take Based on Jefferson *et al.*, (2016).

Sound Source	Species Density	Level A ZOI (km ²)	Level B ZOI (km ²)	Days of Activity	Estimated Level A Take	Estimated Level B Take
1	0.69	0.002564	4.8	10	0	33
2	0.69	0.875111	91	53	32	3,328 (*Adjusted 3,296)
3	0.69	0.017517	2.3	64	0	102

Note:

km² – square kilometers

*Number of Level B takes was adjusted to exclude those already counted for Level A takes. Take is instances not individuals.

Dall's Porpoise

No local monitoring data of Dall's porpoise is available. Therefore, the estimated instances of take for Dall's porpoise is based on U.S. Navy species density estimates (U.S. Navy 2015), as shown in Table 14. Based on these calculations, NMFS proposes to authorize instances of take by Level A harassment of two Dall's porpoise and instances take by Level B harassment of 196 Dall's porpoise.

Table 14. Dall's Porpoise Estimated Take Based on NMSDD Presented for Comparison.

Sound Source	Species Density	Level A ZOI (km²)	Level B ZOI (km²)	Days of Activity	Estimated Level A Take	Estimated Level B Take
1	0.039	0.002564	4.8	10	0	2
2	0.039	0.875111	91	53	2	190 (*Adjusted 188)
3	0.039	0.017517	2.3	64	0	6

Note:

km² – square kilometers

*Number of Level B takes was adjusted to exclude those already counted for Level A takes.

Humpback Whale

Based on U.S. Navy species density estimates (U.S. Navy 2015), potential take of humpback whale is shown in Table 15. Although the standard take calculations would result in an estimated take of less than one humpback whale, to be conservative, the Seattle DOT is requesting authorization for instances of take by Level B harassment of five humpback whales based on take during previous work in Elliott Bay where two humpback whales were observed, including one take, during the 175 days of work during the previous four years (Anchor QEA 2014, 2015, 2016, and 2017). Since the Level A Harassment Zones of low-frequency cetaceans are smaller during vibratory removal (27.3 m) or impact installation (88.6 m) compared to the Level A Harassment Zone for vibratory installation (504.8 m) (Table 7), we do not consider it likely that any humpbacks would be taken by Level A harassment during removal or impact installation. We also do not believe any humpbacks would be taken during vibratory installation due to the ability to see humpbacks easily during monitoring and additional coordination with the Orca Network and the CWR which would enable the work to be shut down before a humpback would be taken by Level A harassment.

Table 15. Humpback Whale Estimated Take Based on NMSDD Presented for Comparison.

Sound Source	Species Density	Level A ZOI (km²)	Level B ZOI (km²)	Days of Activity	Estimated Level A Take	Estimated Level B Take
1	0.00001	0.001171	4.8	10	0	0
2	0.00001	0.400275	91	53	0	0
3	0.00001	0.012331	2.3	64	0	0

Note:
km² – square kilometers

Gray Whale

No local monitoring data of gray whales is available. Therefore, the instances of estimated take for gray whales is based on U.S. Navy species density estimates (U.S. Navy 2015), as shown in Table 16. Therefore, the Seattle DOT is requesting authorization for instances of take by Level B harassment of four gray whales. Since the Level A Harassment Zones of low-frequency cetaceans are smaller during vibratory removal (27.3 m) or impact installation (88.6 m) compared to the Level A Harassment Zone for vibratory installation (504.8 m) (Table 7), we do not consider it likely that any gray whales would be taken by Level A harassment during removal or impact installation. We also do not believe any gray whales would be taken by Level A harassment during vibratory installation due to the ability to see gray whales easily during monitoring and additional coordination with the Orca Network and the CWR, which would enable the work to be shut down before a gray whale would be taken by Level A harassment.

Table 16. Gray Whale Estimated Take Based on NMSDD Presented for Comparison.

Sound Source	Species Density	Level A ZOI (km²)	Level B ZOI (km²)	Days of Activity	Estimated Level A Take	Estimated Level B Take
1	0.00051	0.001171	4.8	10	0	0
2	0.00051	0.400275	91	53	0	3
3	0.00051	0.012331	2.3	64	0	1

Note:
km² – square kilometers

Minke Whale

Between 2008 and 2014, the Whale Museum (as cited in WSDOT 2016a) reported one sighting in the relevant area. To be conservative the Seattle DOT is requesting authorization for instances of take by Level B harassment of two minke whales, based on previous sightings in the construction area by the Whale Museum. Based on the low probability that a minke whale would be observed during the project and then also enter into a Level A zone, we do not consider it likely that any minke whales would be taken by Level A harassment. As a comparison, based on U.S. Navy species density estimates (U.S. Navy 2015), the instance of potential take of minke whales is expected to be zero (Table 17).

Table 17. Minke Whale Estimated Take Based on NMSDD Presented for Comparison.

Level B Zone	Species Density	Level A ZOI (km ²)	Level B ZOI (km ²)	Days of Activity	Estimated Level A Take	Estimated Level B Take
1	0.00003	0.001171	4.8	10	0	0
2	0.00003	0.400275	91	53	0	<1
3	0.00003	0.012331	2.3	64	0	0

Note:
km² – square kilometers

The summary of the authorized take by Level A and Level B Harassment is described below in Table 18.

Table 18. Summary of Requested Incidental Take by Level A and Level B Harassment

Species	Stock Size	Authorized Level A Take	Authorized Level B Take	Authorized Total Take	% of Population
Pacific harbor seal (<i>Phoca vitulina</i>)	11,036	4	1,647 ^a	1,651	14.96
Northern elephant seal (<i>Mirounga angustirostris</i>)	179,000	0	1 ^b	1	Less than 1
California sea lion (<i>Zalophus californianus</i>)	296,750	0	1,905 ^c	1,905	Less than 1

Species	Stock Size	Authorized Level A Take	Authorized Level B Take	Authorized Total Take	% of Population
Steller sea lion (<i>Eumetopias jubatus</i>)	41,638	0	185	185	Less than 1
Southern resident killer whale DPS (<i>Orcinus orca</i>)	83	0	23 (single occurrence of one pod) ^d	23 (single occurrence of one pod)	27.1
Transient killer whale (<i>Orcinus orca</i>)	240	0	42 ^e	42	17.5
Long-beaked common dolphin (<i>Dephinus capensis</i>)	101,305	0	20 ^f	20	Less than 1
Bottlenose dolphin (<i>Tursiops truncatus</i>)	1,924	0	7 ^g	7	Less than 1
Harbor porpoise (<i>Phocoena phocoena</i>)	11,233	32	3,431	3,463	30.82
Dall's porpoise (<i>Phocoenoides dalli</i>)	25,750	2	196	198	Less than 1
Humpback whale (<i>Megaptera novaengliae</i>)	1,918	0	5 ^h	5	Less than 1
Gray whale (<i>Eschrichtius robustus</i>)	20,990	0	4	4	Less than 1
Minke whale (<i>Balaenoptera acutorostrata</i>)	636	0	2 ⁱ	2	Less than 1

Note:

^a The take estimate is based on a maximum of 13 seals observed on a given day during the 2016 Seattle Test Pile project. The number of Level B takes was adjusted to exclude those already counted for Level A takes.

^b The take estimate is based on The Whale Museum (as cited in WSDOT 2016a) reporting one sighting of a northern elephant seal in the area between 2008 and 2014.

^c The take estimate is based on a maximum of 15 California sea lions observed on a given day during 4 monitoring seasons of the EBSP project.

^d The take estimate is based on a single occurrence of one pod of SRKW (*i.e.*, J-pod of 24 SRKW) that would be most likely to be seen near Seattle.

^e The take estimate is based on local data which is greater than the estimates produced using the Navy density estimates.

^f The take estimate is based on the Orca Network (2016c) reporting a pod of up to 20 long-beaked common dolphins.

^g The take estimate is based on local data. A group of seven dolphins were observed in Puget Sound in 2017 and were positively identified as part of the CA coastal stock (Cascadia Research Collective, 2017).

^h The take estimate is based on take during previous work in Elliott Bay, where two humpback whales were observed and is greater than what was calculated using 2015 Navy density estimates.

ⁱ The take estimate is based on The Whale Museum (as cited in WSDOT 2016a) reporting one sighting in the relevant area. Although the take calculations would result in an estimated take of less than one minke whale, to be conservative the Seattle DOT is requesting take of two minke whales.

Proposed Mitigation

In order to issue an IHA under Section 101(a)(5)(D) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to such activity, “and other means of effecting the least practicable impact on such species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of such species or stock for taking” for certain subsistence uses (latter not applicable for this action). NMFS regulations require applicants for incidental take authorizations to include information about the availability and feasibility (economic and technological) of equipment, methods, and manner of conducting such activity or other means of effecting the least practicable adverse impact upon the affected species or stocks and their habitat (50 CFR 216.104(a)(11)).

In evaluating how mitigation may or may not be appropriate to ensure the least practicable adverse impact on species or stocks and their habitat, as well as subsistence uses where applicable, we carefully consider two primary factors:

1) the manner in which, and the degree to which, the successful implementation of the measure(s) is expected to reduce impacts to marine mammals, marine mammal species or stocks, and their habitat. This considers the nature of the potential adverse impact being mitigated (likelihood, scope, range). It further considers the likelihood that the measure will be effective if implemented (probability of accomplishing the mitigating result if implemented as planned) the likelihood of effective implementation (probability implemented as planned), and;

2) the practicability of the measures for applicant implementation, which may consider such things as cost, impact on operations.

Several measures for mitigating effects on marine mammals and their habitat from the pile installation and removal activities at Pier 62 are described below.

Timing Restrictions

All work will be conducted during daylight hours.

Pre-Construction Briefing

Seattle DOT shall conduct briefings for construction supervisors and crews, the monitoring team, and Seattle DOT staff prior to the start of all pile driving activity, and when new personnel join the work, in order to explain responsibilities, communication procedures, the marine mammal monitoring protocol, and operational procedures.

Bubble Curtain

A bubble curtain will be used during pile driving activities with an impact hammer to reduce sound levels. Seattle DOT has stated as part of their specified activity that they and has agreed to employ a bubble curtain during impact pile driving of steel piles and will implement the following bubble curtain performance standards:

- (i) The bubble curtain must distribute air bubbles around 100 percent of the piling perimeter for the full depth of the water column.
- (ii) The lowest bubble curtain ring will be deployed on or as close to the mudline for the full circumference of the ring as possible, without causing turbidity.
- (iii) Seattle DOT will require that construction contractors train personnel in the proper balancing of air flow to the bubblers, and will require that construction contractors submit an inspection/performance report for approval by Seattle DOT within 72 hours following the performance test. Corrections to the attenuation device to meet the performance standards will occur prior to impact driving.

Shutdown Zones

Shutdown Zones will be implemented to protect marine mammals from Level A harassment (Table 20 below). The PTS isopleths described in Table 7 were used as a starting

point for calculating the shutdown zones; however, Seattle DOT will implement a minimum shutdown zone of a 10 m radius around each pile for all construction methods for all marine mammals. Therefore, in some cases the shutdown zone will be slightly larger than was calculated for the PTS isopleths as described in Table 7 (*i.e.*, for mid-frequency cetaceans and otariid pinnipeds). Outside of any Level A take authorized, if a marine mammal is observed at or within the Shutdown Zone, work will shut down (stop work) until the individual has been observed outside of the zone, or has not been observed for at least 15 minutes for all marine mammals. . A determination that the shutdown zone is clear must be made during a period of good visibility (*i.e.*, the entire shutdown zone and surrounding waters must be visible to the naked eye). If a marine mammal approaches or enters the shutdown zone during activities or pre-activity monitoring, all pile driving activities at that location shall be halted or delayed, respectively. If pile driving is halted or delayed due to the presence of a marine mammal, the activity may not resume or commence until either the animal has voluntarily left and been visually confirmed beyond the shutdown zone and 15 minutes have passed without re-detection of the animal. Pile driving activities include the time to install or remove a single pile or series of piles, as long as the time elapsed between uses of the pile driving equipment is no more than thirty minutes.

Table 20. Shutdown zones for various pile driving activities for marine mammal hearing groups.

Sound Source Type	Shutdown Zones (meters)				
	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
1 - Vibratory (pile removal)	27	10	40	17	10
2 - Vibratory (installation)	505	45	746	307	22
3 - Impact (installation)	89	10	106	47	10

Additional Shutdown Measures

For in-water heavy machinery activities other than pile driving, if a marine mammal comes within 10 m, operations shall cease and vessels shall reduce speed to the minimum level required to maintain steerage and safe working conditions.

Seattle DOT will implement shutdown measures if the cumulative total number of individuals observed within the Level B Harassment/Monitoring Zones (below in Table 21) for any particular species reaches the number authorized under the IHA and if such marine mammals are sighted within the vicinity of the project area and are approaching the Level B Harassment/Monitoring Zone during in-water construction activities.

Level B Harassment/Monitoring Zones

Seattle DOT will monitor the Level B Harassment/Monitoring Zones as described in Table 21.

Table 21. Level B Harassment/Monitoring Zones for various pile driving activities

Activity	Construction Method	Level B Threshold (m)	Level B ZOI (km²)
Removal of 14-in Timber Piles	Vibratory	1,848	4.8
Installation of 30-in Steel Piles	Vibratory	54,117	91
Installation of 30-in Steel Piles	Impact	2,929	2.3

Soft-Start for Impact Pile Driving

Each day at the beginning of impact pile driving or any time there has been cessation or downtime of 30 minutes or more without impact pile driving, Seattle DOT will use the soft-start

technique by providing an initial set of three strikes from the impact hammer at 40 percent energy, followed by a 30-second waiting period, then two subsequent three-strike sets.

Additional Coordination

The project team will monitor and coordinate with local marine mammal networks on a daily basis (*i.e.*, Orca Network and/or the CWR) for sightings data and acoustic detection data to gather information on the location of whales prior to pile removal or pile driving activities. The project team will also coordinate with WSF to discuss marine mammal sightings on days when pile driving and removal activities are occurring on their nearby projects. Marine mammal monitoring will be conducted to collect information on the presence of marine mammals within the Level B Harassment/Monitoring Zones for this project. In addition, reports will be made available to interested parties upon request. With this level of coordination in the region of activity, Seattle DOT will get real-time information on the presence or absence of whales before starting any pile driving or removal activities.

During Season 1, Seattle DOT carried out additional voluntary mitigation measures during pile driving and removal activities to minimize impacts from noise on the Seattle Aquarium's captive marine mammals as well as for air and water quality concerns. These measures were successfully coordinated and implemented, and Seattle DOT will implement the same measures during Season 2 work, as follows:

1. If aquarium animals are determined by the Aquarium veterinarian to be distressed, Seattle DOT will coordinate with Aquarium staff to determine appropriate next steps, which may include suspending pile driving work for 30 minutes, provided that suspension does not pose a safety issue for the Pier 62 project construction crews.

2. Seattle DOT will make reasonable efforts to take at least one regularly scheduled 20-minute break in pile driving each day.
3. Seattle DOT will regularly communicate with the Aquarium staff when pile driving is occurring.
4. Seattle DOT will further coordinate with the Aquarium to determine appropriate methods to avoid and minimize impacts to water quality.
5. Seattle DOT does not anticipate the project resulting in impacts associated with airborne dust. If, during construction, odors associated with the project are an issue, Seattle DOT will coordinate with its contractor to determine appropriate mitigation measures.

Based on our evaluation of the applicant's mitigation measures, as well as other measures considered by NMFS, NMFS has preliminarily determined that the mitigation measures provide the means of effecting the least practicable impact on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance.

Proposed Monitoring and Reporting

In order to issue an IHA for an activity, Section 101(a)(5)(D) of the MMPA states that NMFS must set forth, "requirements pertaining to the monitoring and reporting of such taking." The MMPA implementing regulations at 50 CFR 216.104 (a)(13) indicate that requests for authorizations must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present in the action area. Effective reporting is critical both to compliance as well as ensuring that the most value is obtained from the required monitoring.

Monitoring and reporting requirements prescribed by NMFS should contribute to improved understanding of one or more of the following:

- Occurrence of marine mammal species or stocks in the area in which take is anticipated (*e.g.*, presence, abundance, distribution, density).
- Nature, scope, or context of likely marine mammal exposure to potential stressors/impacts (individual or cumulative, acute or chronic), through better understanding of: (1) action or environment (*e.g.*, source characterization, propagation, ambient noise); (2) affected species (*e.g.*, life history, dive patterns); (3) co-occurrence of marine mammal species with the action; or (4) biological or behavioral context of exposure (*e.g.*, age, calving or feeding areas).
- Individual marine mammal responses (behavioral or physiological) to acoustic stressors (acute, chronic, or cumulative), other stressors, or cumulative impacts from multiple stressors.
- How anticipated responses to stressors impact either: (1) long-term fitness and survival of individual marine mammals; or (2) populations, species, or stocks.
- Effects on marine mammal habitat (*e.g.*, marine mammal prey species, acoustic habitat, or other important physical components of marine mammal habitat).
- Mitigation and monitoring effectiveness.

Marine mammal monitoring will be conducted at all times during in-water pile driving and pile removal activities in strategic locations around the area of potential effects as described below:

- During pile removal or installation with a vibratory hammer, three to four monitors would be used, positioned such that each monitor has a distinct view-

shed and the monitors collectively have overlapping view-sheds (refer to Appendix A, Figures 1-3 of the Seattle DOT's application).

- During pile driving activities with an impact hammer, one monitor, based at or near the construction site, will conduct the monitoring.
- In the case(s) where visibility becomes limited, additional land-based monitors and/or boat-based monitors may be deployed.
- Monitors will record take when marine mammals enter the relevant Level B Harassment/Monitoring Zones based on type of construction activity.
- If a marine mammal approaches a Shutdown Zone, the observation will be reported to the Construction Manager and the individual will be watched closely. If the marine mammal crosses into a Shutdown Zone, a stop-work order will be issued. In the event that a stop-work order is triggered, the observed marine mammal(s) will be closely monitored while it remains in or near the Shutdown Zone, and only when it moves well outside of the Shutdown Zone or has not been observed for at least 15 minutes for pinnipeds and small cetaceans and 30 minutes for large whales will the lead monitor allow work to recommence.

Protected species observers

Seattle DOT will employ NMFS-approved protected species observers (PSOs) to conduct marine mammal monitoring for its Pier 62 Project. The PSOs will observe and collect data on marine mammals in and around the project area for 30 minutes before, during, and for 30 minutes after all pile removal and pile installation work. NMFS-approved PSOs will meet the following requirements:

1. Independent observers (*i.e.*, not construction personnel) are required.

2. At least one observer must have prior experience working as an observer.
3. Other observers may substitute education (undergraduate degree in biological science or related field) or training for experience.
4. Where a team of three or more observers are required, one observer should be designated as lead observer or monitoring coordinator. The lead observer must have prior experience working as an observer.
5. NMFS will require submission and approval of observer CVs.
6. PSOs will monitor marine mammals around the construction site using high-quality binoculars (*e.g.*, Zeiss, 10 x 42 power) and/or spotting scopes. Due to the different sizes of the Level B Harassment/Monitoring Zones from different pile sizes, several different Level B Harassment/Monitoring Zones and different monitoring protocols corresponding to a specific pile size will be established.
7. If marine mammals are observed, the following information will be documented:
 - (A) Date and time that monitored activity begins or ends;
 - (B) Construction activities occurring during each observation period;
 - (C) Weather parameters (*e.g.*, percent cover, visibility);
 - (D) Water conditions (*e.g.*, sea state, tide state);
 - (E) Species, numbers, and, if possible, sex and age class of marine mammals;
 - (F) Description of any observable marine mammal behavior patterns, including bearing and direction of travel and distance from pile driving activity;
 - (G) Distance from pile driving activities to marine mammals and distance

- from the marine mammals to the observation point;
- (H) Locations of all marine mammal observations; and
- (I) Other human activity in the area.

Acoustic Monitoring

In addition, acoustic monitoring will occur on up to six days per in-water work season to evaluate, in real time, sound production from construction activities and will capture all hammering scenarios that may occur under the proposed project. Background noise recordings (in the absence of pile-related work) will also be made during the study to provide a baseline background noise profile. Acoustic monitoring will follow NMFS's 2012 Guidance Documents: Sound Propagation Modeling to Characterize Pile Driving Sounds Relevant to Marine Mammals; Data Collection Methods to Characterize Impact and Vibratory Pile Driving Source Levels Relevant to Marine Mammals; and Data Collection Methods to Characterize Underwater Background Sound Relevant to Marine Mammals in Coastal Nearshore Waters and Rivers of Washington and Oregon.

The results and conclusions of the acoustic monitoring will be summarized and presented to NMFS with recommendations on any modifications to this plan or Shutdown Zones.

Reporting Measures

Marine Mammal Monitoring Report

Seattle DOT will submit a draft marine mammal monitoring report within 90 days after completion of the in-water construction work, the expiration of the IHA (if issued), or 60 days prior to the requested date of issuance of any subsequent IHA, whichever sooner.. The report would include data from marine mammal sightings as described: date, time, location, species, group size, and behavior, any observed reactions to construction, distance to operating pile

hammer, and construction activities occurring at time of sighting and environmental data for the period (*i.e.*, wind speed and direction, sea state, tidal state, cloud cover, and visibility). The marine mammal monitoring report will also include total takes, takes by day, and stop-work orders for each species. NMFS will have an opportunity to provide comments on the report, and if NMFS has comments, Seattle DOT will address the comments and submit a final report to NMFS within 30 days.

In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by the IHA, such as an injury (Level A harassment), serious injury, or mortality, Seattle DOT would immediately cease the specified activities and immediately report the incident to the Permits and Conservation Division, Office of Protected Resources, NMFS and the NMFS' West Coast Stranding Coordinator. The report must include the following information:

- Time, date, and location (latitude/longitude) of the incident;
- Name and type of vessel involved;
- Vessel's speed during and leading up to the incident;
- Description of the incident;
- Status of all sound source use in the 24 hrs preceding the incident;
- Water depth;
- Environmental conditions (*e.g.*, wind speed and direction, sea state, cloud cover, and visibility);
- Description of all marine mammal observations in the 24 hrs preceding the incident;
- Species identification or description of the animal(s) involved;

- Fate of the animal(s); and
- Photographs or video footage of the animal(s) (if equipment is available).

Activities would not resume until NMFS is able to review the circumstances of the prohibited take. NMFS would work with Seattle DOT to determine what is necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. Seattle DOT may not resume their activities until notified by NMFS via letter, email, or telephone.

Reporting of Injured or Dead Marine Mammals

In the event that Seattle DOT discovers an injured or dead marine mammal, and the lead PSO determines that the cause of the injury or death is unknown and the death is relatively recent (*i.e.*, in less than a moderate state of decomposition as described in the next paragraph), Seattle DOT will immediately report the incident to the Permits and Conservation Division, Office of Protected Resources, NMFS and the NMFS' West Coast Stranding Coordinator. The report must include the same information identified in the paragraph above. Activities may continue while NMFS reviews the circumstances of the incident. NMFS would work with Seattle DOT to determine whether modifications in the activities are appropriate.

In the event that Seattle DOT discovers an injured or dead marine mammal, and the lead PSO determines that the injury or death is not associated with or related to the activities authorized in the IHA (*e.g.*, previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), Seattle DOT will report the incident to the Permits and Conservation Division, Office of Protected Resources, NMFS and the NMFS Stranding Hotline and/or by email to the NMFS' West Coast Stranding Coordinator within 24 hrs of the discovery. Seattle DOT would provide photographs or video footage (if available) or other documentation

of the stranded animal sighting to NMFS. Activities may continue while NMFS reviews the circumstances of the incident.

Acoustic Monitoring Report

Seattle DOT will submit an Acoustic Monitoring Report within 90 days after completion of the in-water construction work or the expiration of the IHA (if issued), whichever comes earlier. The report will provide details on the monitored piles, method of installation, monitoring equipment, and sound levels documented during both the sound source measurements and the background monitoring. NMFS will have an opportunity to provide comments on the report or changes in monitoring for a third season (if needed), and if NMFS has comments, Seattle DOT will address the comments and submit a final report to NMFS within 30 days. If no comments are received from NMFS within 30 days, the draft report will be considered final. Any comments received during that time will be addressed in full prior to finalization of the report.

Negligible Impact Analysis and Determination

NMFS has defined negligible impact as “an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival” (50 CFR 216.103). A negligible impact finding is based on the lack of likely adverse effects on annual rates of recruitment or survival (*i.e.*, population-level effects). An estimate of the number of takes alone is not enough information on which to base an impact determination. In addition to considering estimates of the number of marine mammals that might be “taken” through harassment, NMFS considers other factors, such as the likely nature of any responses (*e.g.*, intensity, duration), the context of any responses (*e.g.*, critical reproductive time or location, migration), as well as effects on habitat, and the likely effectiveness of the mitigation. We also assess the number,

intensity, and context of estimated takes by evaluating this information relative to population status. Consistent with the 1989 preamble for NMFS's implementing regulations (54 FR 40338; September 29, 1989), the impacts from other past and ongoing anthropogenic activities are incorporated into this analysis via their impacts on the environmental baseline (*e.g.*, as reflected in the regulatory status of the species, population size and growth rate where known, ongoing sources of human-caused mortality, or ambient noise levels).

No serious injury or mortality is anticipated or authorized for the Pier 62 Project (Season 2). Takes that are anticipated and authorized are expected to be limited to short-term Level A and Level B (behavioral) harassment. Marine mammals present in the vicinity of the action area and taken by Level A and Level B harassment would most likely show overt brief disturbance (startle reaction) and avoidance of the area from elevated noise levels during pile driving and pile removal. However, many marine mammals showed no observable changes during Season 1 of the Pier 62 project and similar project activities for the EBSP.

A fair number of instances of takes are expected to be repeat takes of the same animals. This is particularly true for harbor porpoise, because they generally use subregions of Puget Sound, and the abundance of the Seattle sub-region from the Puget Sound Study was estimated to be 147 animals, which is much lower than the calculated take. Very few harbor porpoises have been observed during past projects in Elliott Bay (ranging from one to five harbor porpoises).

There are two endangered species that may occur in the project area, humpback whales and SRKW. However, few humpbacks are expected to occur in the project area and few have been observed during previous projects in Elliott Bay. SRKW have occurred in small numbers in the project area. Seattle DOT will shut down in the Level B Harassment/Monitoring Zones should they meet or exceed the take of one occurrence of one pod (J-pod, 24 whales).

There is ESA-designated critical habitat in the vicinity of Seattle DOT's Pier 62 Project for SRKW. However, this IHA is authorizing the harassment of marine mammals, not the production of sound, which is what would result in adverse effects to critical habitat for SRKW.

There is one documented harbor seal haulout area near Bainbridge Island, approximately 6 miles (9.66 km) from Pier 62. The haulout, which is estimated at less than 100 animals, consists of intertidal rocks and reef areas around Blakely Rocks and is at the outer edge of potential effects at the outer extent near Bainbridge Island (Jefferies *et al.* 2000). The recent level of use of this haulout is unknown. Harbor seals also make use of docks, buoys, and beaches in the project area, as noted in marine mammal monitoring reports for Season 1 of the Pier 62 Project and for the EBSP (Anchor QEA 2014, 2015, 2016, and 2017). The observational data from previous projects on the Seattle waterfront have documented only a fraction of what is calculated using the Navy density estimates for Puget Sound; therefore, we believe the actual take will be much lower than the calculated take. Similarly, the nearest Steller sea lion haulout to the project area is located approximately 6 miles away (9.66 km) and is also on the outer edge of potential effects. This haulout is composed of net pens offshore of the south end of Bainbridge Island. There are four documented California sea lion haulout areas near Bainbridge Island as well, approximately six miles from Pier 62, and two documented haulout areas between Bainbridge Island and Magnolia (Jefferies *et al.* 2000). The haulouts consist of buoys and floats, and some are within the area of potential effects, but at the outer extent, and some are just outside the area of potential effects (Jefferies *et al.* 2000). California sea lions were also frequently observed during marine mammal monitoring for Season 1 of the Pier 62 project (average of eight sea lions) at the Alki monitoring site and were frequently observed resting on two buoys in the southwest area of Elliott Bay. California sea lions were also frequently

observed during the EBSP (average seven per day in 2014 and 2015, and three per day in 2016 and 2017; Anchor QEA 2014, 2015, 2016, and 2017), resting on two navigational buoys within the project area (near Alki Point) and swimming along the shoreline near the project.

The project also is not expected to have significant adverse effects on affected marine mammal habitat, as analyzed in the “Potential Effects of Specified Activities on Marine Mammals and their Habitat” section. Project activities would not permanently modify existing marine mammal habitat. The activities may kill some fish and cause other fish to leave the area temporarily, thus impacting marine mammals’ foraging opportunities in a limited portion of the foraging range; but, because of the short duration of the activities and the relatively small area of the habitat that may be affected, the impacts to marine mammal habitat are not expected to cause significant or long-term negative consequences. Therefore, given the consideration of potential impacts to marine mammal prey species and their physical environment, Seattle DOT’s Pier 62 Project would not adversely affect marine mammal habitat.

In summary and as described above, the following factors primarily support our determination that the impacts resulting from this activity are not expected to adversely affect the species or stocks through effects on annual rates of recruitment or survival:

- No serious injury or mortality is anticipated or authorized.
- Takes that are anticipated and authorized are expected to be limited to short-term Level B harassment (behavioral) and a small number of takes of Level A harassment for three species.
- The project also is not expected to have significant adverse effects on affected marine mammals’ habitat.

- There are no known important feeding or pupping areas. There are haulouts for California sea lions, harbor seals and Steller sea lions. However, they are at the most outer edge of the potential effects and approximately 6.6 miles from Pier 62. There are no other known important areas for marine mammals.
- For nine of the twelve species, take is less than one percent of the stock abundance. Instances of take for the other three species (harbor seals, killer whales, and harbor porpoise) range from about 15-31 percent of the stock abundance. One occurrence of J-pod of SRKW would account for 29 percent of the stock abundance. However, when the fact that a fair number of these instances are expected to be repeat takes of the same animals is considered, particularly for harbor porpoise, the number of individual marine mammals taken is significantly lower.

Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the monitoring and mitigation measures, NMFS preliminarily finds that the total marine mammal take from the proposed activity will have a negligible impact on all affected marine mammal species or stocks.

Small Numbers

As noted above, only small numbers of incidental take may be authorized under Section 101(a)(5)(D) of the MMPA for specified activities other than military readiness activities. The MMPA does not define small numbers and so, in practice, where estimated numbers are available, NMFS compares the number of individuals taken to the most appropriate estimation of abundance of the relevant species or stock in our determination of whether an authorization is

limited to small numbers of marine mammals. Additionally, other factors may be considered in the analysis, such as the temporal or spatial scale of the activities.

Take of nine of the twelve species is less than one percent of the stock abundance. Instances of take for the SRKW and transient killer whales, harbor seals, and harbor porpoise ranges from about 15-31 percent of the stock abundance. However, when the fact that a fair number of these instances are expected to be repeat takes of the same animals is considered, the number of individual marine mammals taken is significantly lower. Specifically, for example, Jefferson *et al.*, 2016 conducted harbor porpoise surveys in eight regions of Puget Sound, and estimated an abundance of 147 harbor porpoise in the Seattle area (1,798 porpoise in North Puget Sound and 599 porpoise in South Puget Sound). While individuals do move between regions, we would not realistically expect that 3000+ individuals would be exposed around the pile driving for the Seattle DOT's Pier 62 Project. Considering these factors, as well as the general small size of the project area as compared to the range of the species affected, the numbers of marine mammals estimated to be taken are small proportions of the total populations of the affected species or stocks. Further, for SRKW we acknowledge that 27.1 percent of the stock is authorized to be taken by Level B harassment, but we believe that a single, brief incident of take of one group of any species represents take of small numbers for that species. We believe transient killer whales also represents small numbers, as the estimated take is very conservative. Estimated take was derived on local data of seven transients that were observed. However to be conservative, it was assumed that up to two groups of seven transient killer whales may pass through Elliott Bay and stay in the area for up to three days for a total of 42 takes (17.5 percent of the stock). We also believe harbor seal take represents small numbers. Although 14.96 percent of the stock is authorized, the estimated take was based on a maximum number of harbor

seals observed in a day (13) and is therefore conservative as to what has been observed previously. Observations from Season 1 of the Pier 62 project ranged from 0 to 11 harbor seals daily. Based on the analysis contained herein of the proposed activity (including the mitigation and monitoring measures) and the anticipated take of marine mammals, NMFS preliminarily finds that small numbers of marine mammals will be taken relative to the population sizes of the affected species or stocks.

Unmitigable Adverse Impact Analysis and Determination

There are no relevant subsistence uses of the affected marine mammal stocks or species implicated by this action. Therefore, NMFS has preliminarily determined that the total taking of affected species or stocks would not have an unmitigable adverse impact on the availability of such species or stocks for taking for subsistence purposes.

Endangered Species Act (ESA)

Section 7(a)(2) of the ESA of 1973 (16 U.S.C. § 1531 *et seq.*) requires that each Federal agency insure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat. To ensure ESA compliance for the issuance of IHAs, NMFS consults internally, in this case with the West Coast Regional Office (WCRO), whenever we propose to authorize take for endangered or threatened species.

NMFS is proposing to authorize take of SRKW and humpback whales, which are listed under the ESA. The Permit and Conservation Division has requested initiation of Section 7 consultation with the West Coast Regional Office for the issuance of this IHA. NMFS will conclude the ESA consultation prior to reaching a determination regarding the proposed issuance of the authorization.

Proposed Authorization

As a result of these preliminary determinations, NMFS proposes to issue an IHA to Seattle DOT for conducting piledriving activities at Pier 62 (Season 2), Elliott Bay, Seattle, Washington from August 2018 through February 2019, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated. This section contains a draft of the IHA itself. The wording contained in this section is proposed for inclusion in the IHA (if issued).

The proposed IHA language is provided next.

1. This Authorization is valid from August 1, 2018, through February 28, 2019.
2. This Authorization is valid only for activities associated with in-water construction work at the Seattle Department of Transportation's (Seattle DOT) Pier 62 Project (Season 2) in Elliott Bay, Seattle, Washington.
3. General Conditions

(a) The species authorized for taking, by Level A harassment and Level B harassment, and in the numbers shown in Table 18 are: harbor seal (*Phoca vitulina*), northern elephant seal (*Mirounga angustirostris*), California sea lion (*Zalophus californianus*), Steller sea lion (*Eumetopias jubatus*), harbor porpoise (*Phocoena phocoena*), Dall's porpoise (*Phocoenoides dalli*), long-beaked common dolphin (*Delphinus capensis*), bottlenose dolphin (*Tursiops truncatus*), both southern resident killer whale (SRKW) and transient killer whale (*Orcinus orca*), humpback whale (*Megaptera novaeangliae*), gray whale (*Eschrichtius robustus*), and minke whale (*Balaenoptera acutorostrata*).

(b) The authorization for taking by harassment is limited to the following acoustic sources and from the following activities:

- Impact pile driving;
- Vibratory pile driving; and
- Vibratory pile removal

4. Prohibitions

The taking, by incidental harassment only, is limited to the species listed under condition 3(a) above and by the numbers listed in Table 18 of this notice. The taking by serious injury or death of these species or the taking by harassment, injury or death of any other species of marine mammal is prohibited unless separately authorized or exempted under the MMPA and may result in the modification, suspension, or revocation of this Authorization.

5. Mitigation Measures

The holder of this Authorization shall be required to implement the following mitigation measures:

(a) Timing Restriction

In-water construction work shall occur only during daylight hours.

(b) Pre-Construction Briefing

Seattle DOT shall conduct briefings for construction supervisors and crews, the monitoring team, and Seattle DOT staff prior to the start of all pile driving activity, and when new personnel join the work, in order to explain responsibilities, communication procedures, the marine mammal monitoring protocol, and operational procedures.

(c) Bubble Curtain

A bubble curtain shall be used during pile driving activities with an impact hammer and will be conducted using the following bubble curtain performance standards:

- (i) The bubble curtain must distribute air bubbles around 10 percent of the piling perimeter for the full depth of the water column.

(ii) The lowest bubble curtain ring shall be deployed on or as close to the mudline for the full circumference of the ring as possible, without causing turbidity.

(iii) Seattle DOT shall require that construction contractors train personnel in the proper balancing of air flow to the bubblers, and shall require that construction contractors submit an inspection/performance report for approval by Seattle DOT within 72 hours following the performance test. Corrections to the attenuation device to meet the performance standards shall occur prior to impact driving.

(d) Level B Harassment/Monitoring Zones

Seattle DOT shall implement the Level B Harassment/Monitoring Zones as described in Table 5 of this notice.

(e) Shutdown Zones

(i) Seattle DOT shall implement shutdown measures if a marine mammal is detected within or approaching the Shutdown Zones as outlined in Table 7.

Seattle DOT shall implement a minimum shutdown zone of 10 m radius around each pile for all construction methods for all marine mammals.

(ii) If a marine mammal is observed at or within the Shutdown Zone, work shall stop until the individual has been observed outside of the zone, or has not been observed for at least 15 minutes for all marine mammals.

(iii) A determination that the shutdown zone is clear must be made during a period of good visibility (*i.e.*, the entire shutdown zone and surrounding waters must be visible to the naked eye).

(iv) If a marine mammal approaches or enters the shutdown zone during activities or pre-activity monitoring, all pile driving activities at that location shall be halted or delayed, respectively. If pile driving is halted or delayed due to the presence of a marine mammal, the activity may not resume or commence until either the animal has voluntarily left and been visually confirmed beyond the shutdown zone and 15 minutes have passed without re-detection of the animal. Pile driving activities include the time to install or remove a single pile or series of piles, as long as the time elapsed between uses of the pile driving equipment is no more than thirty minutes.

(f) Additional Shutdown Measures

- (i) For in-water heavy machinery activities other than pile driving, if a marine mammal comes within 10 m, operations shall cease and vessels shall reduce speed to the minimum level required to maintain steerage and safe working conditions.
- (ii) Seattle DOT shall implement shutdown measures if the cumulative total of individuals observed within the Level B Harassment/Monitoring Zones for any particular species exceeds the number authorized under the IHA and if such marine mammals are sighted within the vicinity of the project area and are approaching the Level B Harassment/Monitoring Zones during in-water construction activities.

(g) Soft-Start for Impact Pile Driving

Each day at the beginning of impact pile driving or any time there has been cessation or downtime of 30 minutes or more without pile driving, contractors shall initiate soft-start for impact hammers by providing an initial set of three strikes from the impact hammer at

40 percent energy, followed by a 30-second waiting period, then two subsequent three-strike sets.

(h) Additional Coordination

The project team shall monitor and coordinate with local marine mammal sighting networks (*i.e.*, The Orca Network and/or The Center for Whale Research) on a daily basis for sightings data and acoustic detection data to gather information on the location of whales prior to initiating pile removal or pile removal activities. The project team shall also coordinate with WSF to discuss marine mammal sightings on days when pile driving and removal activities are occurring on their nearby projects. In addition, reports shall be made available to interested parties upon request. With this level of coordination in the region of activity, Seattle DOT shall obtain real-time information on the presence or absence of whales before starting any pile driving or removal activities.

In addition, to minimize impacts from noise on the Seattle Aquarium's captive marine mammals as well as for air and water quality concerns, Seattle DOT shall implement the following:

- (i) If aquarium animals are determined by the Aquarium veterinarian to be distressed, Seattle DOT shall coordinate with Aquarium staff to determine appropriate next steps, which may include suspending pile driving work for 30 minutes, provided that suspension does not pose a safety issue for the Pier 62 project construction crews.
- (ii) Seattle DOT shall make reasonable efforts to take at least one regularly scheduled 20-minute break in pile driving each day.

- (iii) Seattle DOT shall regularly communicate with the Aquarium staff when pile driving is occurring.
- (iv) Seattle DOT shall further coordinate with the Aquarium to determine appropriate methods to avoid and minimize impacts to water quality.
- (v) Seattle DOT does not anticipate the project resulting in impacts associated with airborne dust. If, during construction, odors associated with the project are an issue, Seattle DOT shall coordinate with its contractor to determine appropriate mitigation measures.

6. Monitoring:

(a) Protected Species Observers

Seattle DOT shall employ NMFS-approved PSOs to conduct marine mammal monitoring for its construction project. NMFS-approved PSOs shall meet the following qualifications.

- (i) Independent observers (*i.e.*, not construction personnel) are required.
- (ii) At least one observer must have prior experience working as an observer.
- (iii) Other observers may substitute education (undergraduate degree in biological science or related field) or training for experience.
- (iv) Where a team of three or more observers are required, one observer should be designated as lead observer or monitoring coordinator. The lead observer must have prior experience working as an observer.
- (v) NMFS shall require submission and approval of observer CVs.

(b) Monitoring Protocols: PSOs shall be present on site at all times during pile removal and driving. Marine mammal visual monitoring will be conducted for different Level B Harassment/Monitoring Zones based on different sizes of piles being driven or removed.

- (i) A 30-minute pre-construction marine mammal monitoring shall be required before the first pile driving or pile removal of the day. A 30-minute post-construction marine mammal monitoring shall be required after the last pile driving or pile removal of the day. If the constructors take a break between subsequent pile driving or pile removal for more than 30 minutes, then additional 30-minute pre-construction marine mammal monitoring shall be required before the next start-up of pile driving or pile removal.
- (ii) During pile removal or installation with a vibratory hammer, three to four monitors shall be used, positioned such that each monitor has a distinct view-shed and the monitors collectively have overlapping view-sheds.
- (iii) During pile driving activities with an impact hammer, one monitor, based at or near the construction site, shall conduct the monitoring.
- (iv) Where visibility becomes limited, additional land-based monitors and/or boat-based monitors shall be deployed.
- (v) Monitors shall record take when marine mammals enter their relevant Level B Harassment/Monitoring Zones based on type of construction activity.
- (vi) If a marine mammal approaches a Shutdown Zone, the observation shall be reported to the Construction Manager and the individual shall be watched closely. If the marine mammal crosses into a Shutdown Zone, a stop-work order shall be issued. In the event that a stop-work order is triggered, the observed

marine mammal(s) shall be closely monitored while it remains in or near the Shutdown Zone, and only when it moves well outside of the Shutdown Zone or has not been observed for at least 15 minutes for pinnipeds and small cetaceans and 15 minutes for large whales will the lead monitor allow work to recommence.

(vii) PSOs shall monitor marine mammals around the construction site using high-quality binoculars (*e.g.*, Zeiss, 10 x 42 power) and/or spotting scopes.

(viii) If marine mammals are observed, the following information shall be documented:

(A) Date and time that monitored activity begins or ends;

(B) Construction activities occurring during each observation period;

(C) Weather parameters (*e.g.*, percent cover, visibility);

(D) Water conditions (*e.g.*, sea state, tide state);

(E) Species, numbers, and, if possible, sex and age class of marine mammals;

(F) Description of any observable marine mammal behavior patterns, including bearing and direction of travel and distance from pile driving activity;

(G) Distance from pile driving activities to marine mammals and distance from the marine mammals to the observation point;

(H) Locations of all marine mammal observations; and

(I) Other human activity in the area.

(ix) Acoustic Monitoring - Seattle DOT shall conduct acoustic monitoring up to six days per in-water work season to evaluate, in real time, sound production

from construction activities and shall capture all hammering scenarios that may occur under the planned project. Background noise recordings (in the absence of pile-related work) shall also be made during the study to provide a baseline background noise profile. Acoustic monitoring shall follow NMFS's 2012 Guidance Documents: *Sound Propagation Modeling to Characterize Pile Driving Sounds Relevant to Marine Mammals*; *Data Collection Methods to Characterize Impact and Vibratory Pile Driving Source Levels Relevant to Marine Mammals*; and *Data Collection Methods to Characterize Underwater Background Sound Relevant to Marine Mammals in Coastal Nearshore Waters and Rivers of Washington and Oregon*.

7. Reporting:

(a) Marine Mammal Monitoring

- (i) Seattle DOT shall submit a draft marine mammal monitoring report within 90 days after completion of the in-water construction work, the expiration of the IHA (if issued), whichever comes earlier. The report shall include data from marine mammal sightings as described in 6(b)(viii). The marine mammal monitoring report shall also include total takes, takes by day, and stop-work orders for each species.
- (ii) If no comments are received from NMFS, the draft report shall be considered the final report. Any comments received during that time shall be addressed in full prior to finalization of the report.
- (iii) In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by the IHA (if issued), such as an

injury (Level A harassment) of unauthorized species, or serious injury, or mortality of any species, Seattle DOT shall immediately cease the specified activities and immediately report the incident to the Permits and Conservation Division, Office of Protected Resources, NMFS and the NMFS' West Coast Stranding Coordinator. The report must include the following information:

- Time, date, and location (latitude/longitude) of the incident;
- Name and type of vessel involved;
- Vessel's speed during and leading up to the incident;
- Description of the incident;
- Status of all sound source use in the 24 hrs preceding the incident;
- Water depth;
- Environmental conditions (*e.g.*, wind speed and direction, sea state, cloud cover, and visibility);
- Description of all marine mammal observations in the 24 hrs preceding the incident;
- Species identification or description of the animal(s) involved;
- Fate of the animal(s); and
- Photographs or video footage of the animal(s) (if equipment is available).

Activities would not resume until NMFS is able to review the circumstances of the prohibited take. NMFS shall work with Seattle DOT to determine what is necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. Seattle DOT shall not resume their activities until notified by NMFS via letter, email, or telephone.

(b) Reporting of Injured or Dead Marine Mammals

(i) In the event that Seattle DOT discovers an injured or dead marine mammal, and the lead PSO determines that the cause of the injury or death is unknown and the death is relatively recent (*i.e.*, in less than a moderate state of decomposition as described in the next paragraph), Seattle DOT shall immediately report the incident to the Permits and Conservation Division, Office of Protected Resources, NMFS and the NMFS' West Coast Stranding Coordinator. The report must include the same information identified in 7(a)(iii). Activities may continue while NMFS reviews the circumstances of the incident. NMFS shall work with Seattle DOT to determine whether modifications in the activities are appropriate.

(ii) In the event that Seattle DOT discovers an injured or dead marine mammal, and the lead PSO determines that the injury or death is not associated with or related to the activities authorized in the IHA (*e.g.*, previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), Seattle DOT shall report the incident to the Permits and Conservation Division, Office of Protected Resources, NMFS and the NMFS Stranding Hotline and/or by email to the NMFS' West Coast Stranding Coordinator within 24 hrs of the discovery. Seattle DOT shall provide photographs or video footage (if available) or other documentation of the stranded animal sighting to NMFS. Activities may continue while NMFS reviews the circumstances of the incident.

(c) Acoustic Monitoring Report - Seattle DOT shall submit an Acoustic Monitoring Report within 90 days after completion of the in-water construction work, expiration

of the IHA (if issued), or 60 days prior to the requested date of issuance of any subsequent IHA, whichever sooner. The report shall provide details on the monitored piles, method of installation, monitoring equipment, and sound levels documented during both the sound source measurements and the background monitoring. NMFS shall have an opportunity to provide comments on the report or changes in monitoring for the second season, and if NMFS has comments, Seattle DOT shall address the comments and submit a final report to NMFS within 30 days. If no comments are received from NMFS within 30 days, the draft report shall be considered final. Any comments received during that time shall be addressed in full prior to finalization of the report.

8. This Authorization may be modified, suspended or withdrawn if the holder fails to abide by the conditions prescribed herein or if NMFS determines the authorized taking is having more than a negligible impact on the species or stock of affected marine mammals.

9. A copy of this Authorization must be in the possession of each contractor who performs the construction work at the Pier 62 Project.

Request for Public Comments

We request comment on our analyses, the proposed authorization, and any other aspect of this Notice of Proposed IHA for the proposed pile driving activities by Seattle DOT. We also request comment on the potential for renewal of this proposed IHA as described in the paragraph below. Please include with your comments any supporting data or literature citations to help inform our final decision on the request for MMPA authorization.

On a case-by-case basis, NMFS may issue a subsequent one-year IHA without additional notice when 1) another year of identical or nearly identical activities as described in the

Specified Activities section is planned or 2) the activities would not be completed by the time the IHA expires and a subsequent IHA would allow for completion of the activities beyond that described in the Dates and Duration section, provided all of the following conditions are met:

- A request for renewal is received no later than 60 days prior to expiration of the current IHA.
- The request for renewal must include the following:
 - (1) An explanation that the activities to be conducted beyond the initial dates either are identical to the previously analyzed activities or include changes so minor (*e.g.*, reduction in pile size) that the changes do not affect the previous analyses, take estimates, or mitigation and monitoring requirements.
 - (2) A preliminary monitoring report showing the results of the required monitoring to date and an explanation showing that the monitoring results do not indicate impacts of a scale or nature not previously analyzed or authorized.
- Upon review of the request for renewal, the status of the affected species or stocks, and any other pertinent information, NMFS determines that there are no more than minor changes in the activities, the mitigation and monitoring measures remain the same and appropriate, and the original findings remain valid.

Elaine T. Saiz,

Acting Deputy Director, Office of Protected Resources,

National Marine Fisheries Service.

